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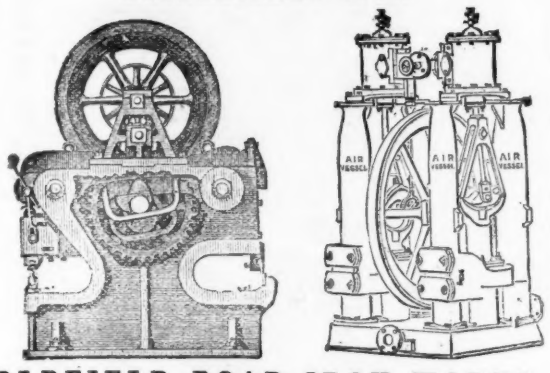

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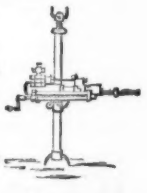

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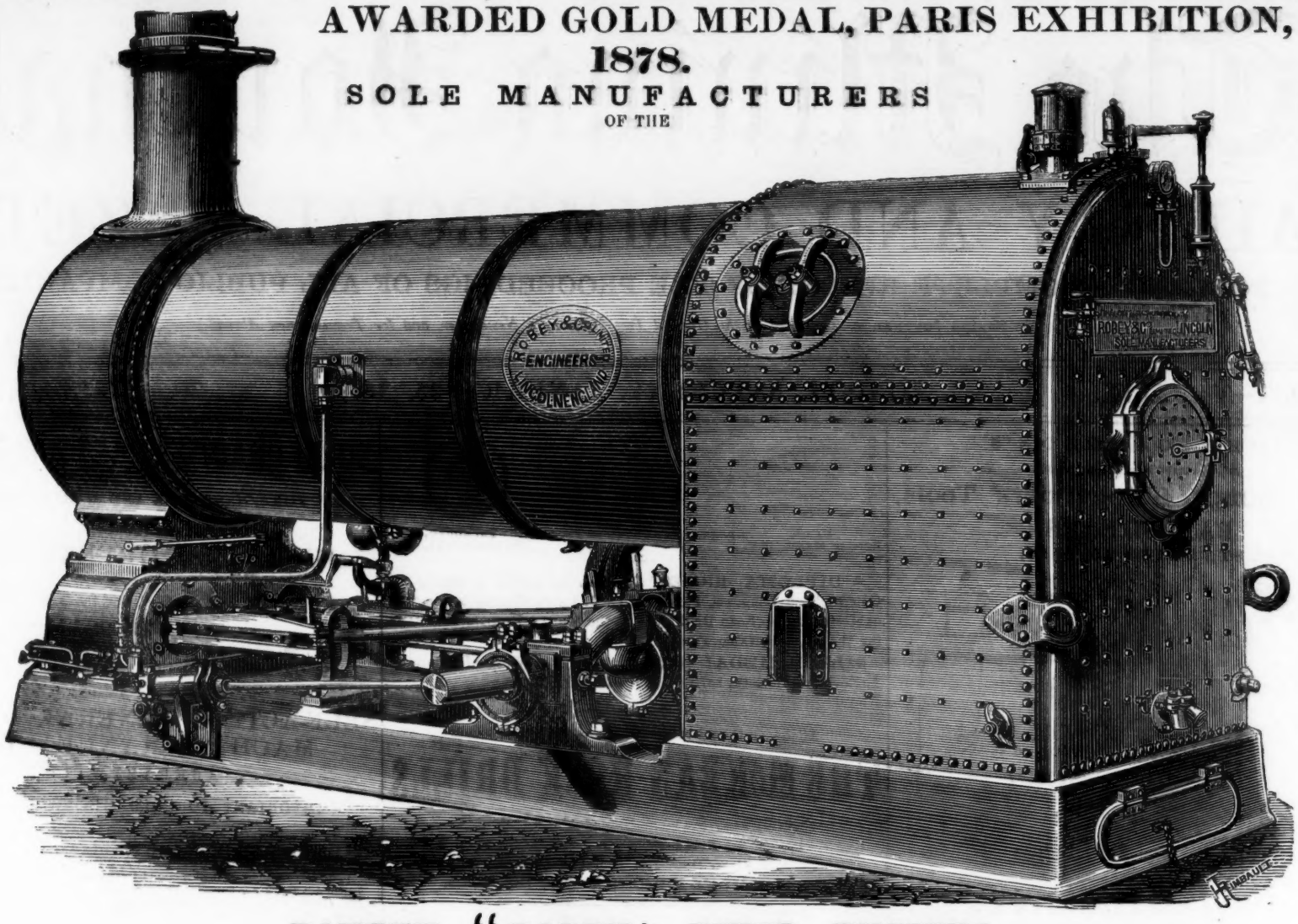

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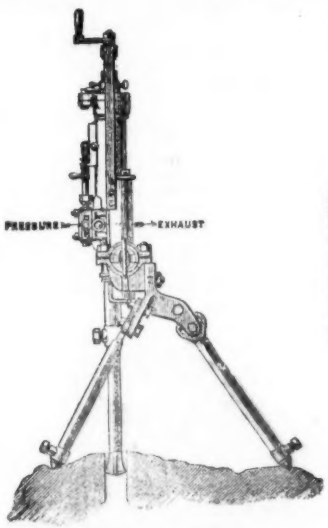

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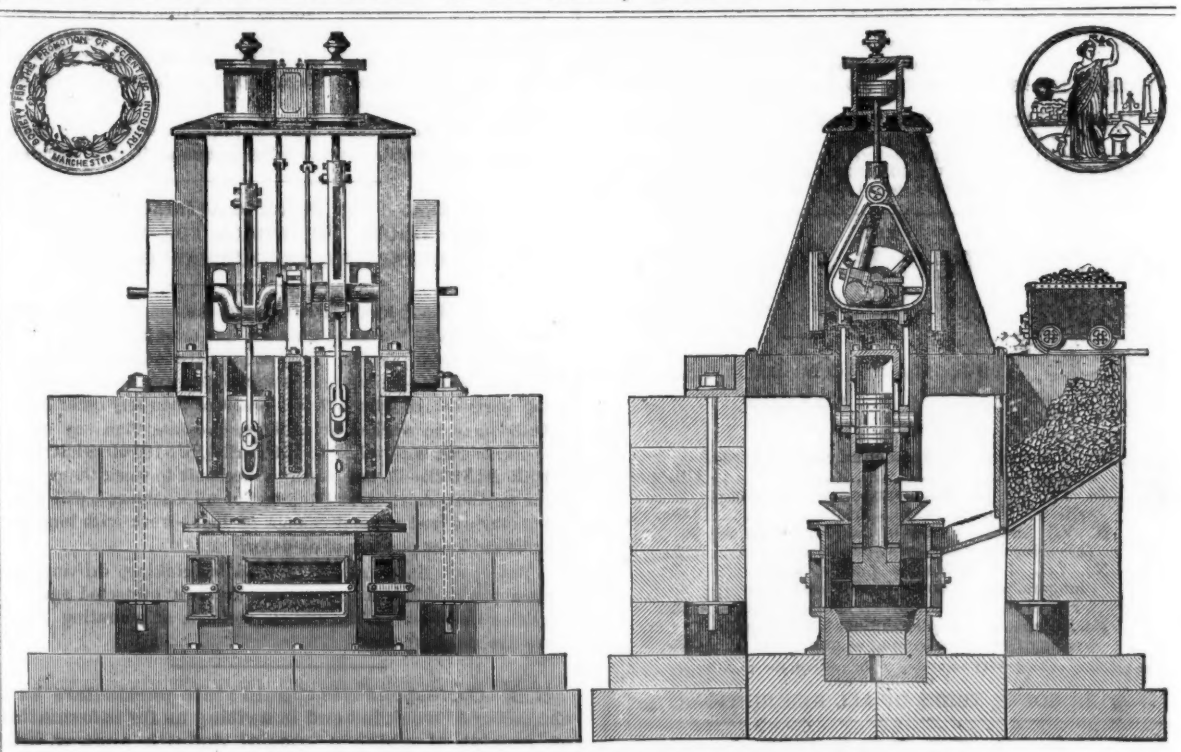

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Original Correspondence.

THE RUIN OF BRITISH MANUFACTURERS AND STARVING ENGLISH WORKMEN BY ONESIDED FREE TRADE.

SIR,—My attention has been called to an article in the Daily Telegraph of Tuesday in reference to Free Trade, Reciprocity, &c., and with your kind permission I will review the said article in the following remarks thereon. The worthy writer of the article referred to starts in the old style of contempt for *all* who are not the so-called "free traders," this "all" consisting of every trading nation on the face of the globe, excepting England, and in a minor degree Turkey (because she has no manufactures of her own to call manufactures from a manufacturing point of view); they are all "fools or knaves" of course according to the views of the immortal trio Bright, Cobden, and Gladstone. The writer of this article appears to wish to make himself even more distinguished than them by his thorough style and persistence in applying the principles of Reciprosity and Free Trade in manufactures to articles of food and necessity, which he well knows the most advanced protectionists does not desire. The writer commences:—

It may be taken as proof of the extent to which the reciprocity craze has fermented the feelings, if not the intellects, of even reputed free-traders that Mr. Forster has thought it necessary to deliver a long address at Bradford on the subject. Bradford is a conspicuous witness to the triumph of commercial freedom in England, and to the absence of all those restrictions which systematic reciprocity implies; but of late it has shared in the depression that has visited every other industry, and some of its citizens appear to have discovered that a freedom of trade which does not guarantee unbroken prosperity is not worth having. Mr. Forster, as may be supposed, had no difficulty in dealing with a form of discontent that is more sentimental than intellectual. No genuine free-traders, taught in the school of Cobden and Bright, and fed upon such strong meat as the text-books of the Anti-Corn Law League agitation, is likely to have his faith in the first principles of his creed shaken by anything that has yet occurred. It is the traders of a later generation, brought up in a period which has seen protection established in the United States, apparently with success, and has also seen a strong current of feeling in its favour set in over the Continent of Europe, it is these, and only these, whose convictions begin to waver with the first signs of adversity.

The great Cobden must, then, have been crazy when he negociated reciprocity treaties with France; or was it that, finding *onesided* free trade *in manufacture* a gigantic mistake, he was trying by some other means to bring about a correction of the dangerous policy he had initiated, and which no other nation on the face of the globe had sufficient foolhardiness to follow? The writer speaks of the discontent being "sentimental." I think if his stomach was as scantily supplied as some of the Bradford folk whom unrestricted foreign competition has left without work, that his discontent would be the reverse of "sentimental." The "text books of the Anti-Corn Law League" have no more to do with admitting the *manufactures* of foreign countries duty free, and taking the means of employment from British manufacturers and labourers, than the improbability that America or any foreign country could refuse to sell us food so long as we can earn the money to buy it with; and the writer knows this unless he has added a little strong drink to the "strong meat" he vapours about. He talks of protection in the United States as established "*apparently* with success," I shall defy him to find a case where American operatives have been so unemployed as to require charitable soup kitchens or new workhouses; on the contrary, they have had food cheap, and plenty are now borrowing money at 4 per cent., whereas they had to pay 6 per cent., and are sending their manufactures broad cast over the globe, and yet theirs is only an "apparently" successful policy. The writer continues:—

Mr. Forster is not a man of this stamp. He believes in commercial, as in all other, freedom, and sees no reason why his countrymen should deny themselves its benefits because other nations blindly cling to an opposite course. There is nothing in the existing troubles which he is not prepared to account for by causes altogether independent of the abstract merits of English fiscal policy. Financial crises, common to most civilised States, the result of previous over-trading, war, famines, industrial disputes, heavy losses by foreign loans—these and a few other influences less important are sufficient to explain every unfavourable turn in English trade which has culminated in the depression we all regret. No one would think of denying that these various causes have had some effect; yet to advocate reciprocity as a preventive or curative measure is to say that fiscal arrangements to check the free flow of trade would do away with scanty harvests. Eastern Questions, stock-gambling, and hasting to become rich by over-loading foreign markets, which is flagrantly absurd.

Universal free trade we *all* believe in, and upon the theory of "extremes meeting," it is exactly the same as *universal* reciprocity, which Cobden wriggled about with the French Emperor to bring about, but which he failed in, as he did in most of his private and public speculations. The little tinpot causes which the article puts forward as causes of depression—"foreign loans," Stock Exchange "gambling," &c.—sinks into insignificance when compared with the steady diminution of our export trade during the past ten years, but men of the Forster type, with their pet theories, must die hard. Again, he says—

As generally presented by its English advocates Reciprocity looks rational enough. We do not, they say, want Protection; we do not even insist on the necessity of imposing higher duties for revenue purposes; all we desire is that the benefit of our free tariffs should be limited to those nations which will engage to give equal advantages to us. None of these nations will be foolish enough to throw away such a market as England, and hence they will promptly agree to our conditions, and grant us as easy terms of admission for our goods as they ask for theirs. If, however, they should not, then let an equally high tariff be imposed on their products, and this will not only punish them, but swell our "revenues" from Customs duties. The assumption that the mere threat of reciprocally high duties will bring foreign States to our terms rather than lose us as customers has no warrant in experience.

It has a far better "warrant in experience" than the one-sided free trade experiment, and if it were adopted it would not be long before many now defunct trades would spring into life again, and the forges of our iron districts be in full blast again. It is true that Belgium, and the Germans, and French might suffer, but are our working men, the pillars of the State, to consider this when their own *existence* is at stake if they would remain in their native land?

The Rouher-Cobden treaty made with France—or, rather, with the Emperor Napoleon—was a reciprocal arrangement; but what was its real history? Although it opened to France the best market she ever had for all her agricultural products, it was only the personal influence of the enlightened Emperor that carried the treaty through, so little did the French people care for the reciprocity promised on the English side. At this moment, when the treaty is denounced, and public opinion in France is divided as to what shall follow, it is admitted that the Republican party is protectionist, and dislikes the Rouher compact because it was purely Imperialist origin. The fear of losing the English market does not influence them in the slightest degree.

The fear of losing the English markets does not influence apparently any other nation; it is too late now to talk about such a fear as this. They have already obtained from us through our folly the advantages we reaped by the discoveries of gold in Australia and California, and the new nations of customers which we created as pioneers of the railway system of intercourse, and they have transferred to their own shores many of our leading manufactures. So long as we *alone had machinery and abundant steam-power* so long they had good reason to "fear" us, notwithstanding the unfair one-sided free trade handicap on British labour, fed partly by foreign purchased food; but now that *they, too, have abundant machinery and steam-power* "ridicule" has taken the place of "fear."

Some of the Republican orators, indeed—M. Louis Blanc, for instance—would probably tell the ignorant masses that if England did not take so much flour, potatoes, eggs, wine, and other products from the French it would be all the better for the latter, since they would have provisions all the cheaper. This is one of the modern proletarian theories for the creation of national wealth, and it seems to be shared by Prince Bismarck.

M. Louis Blanc would tell them nothing of the sort, he would more probably say "England will always buy what 'eggs, potatoes, flour,' &c., that she requires so long as she has the money to buy it with; but you must look out for the day when when she will not have so good a purchasing power as she has had by reason of our manufacturing for her as well as supplying her with food." Adhering to this unfair way of mixing up the question of food supply with manufactured articles, he says:—

Or let us borrow another illustration from Russia. Since that Empire took to manufacturing she has become more and more Protectionist, and she is now imposing duties with the avowed object of excluding English cotton goods and metals. Would a threat on our part to impose a high import duty on Russian wheat and tallow check these Protectionist leanings? He must be strangely ignorant of Russia who would believe it. National antipathy and race rivalry of itself would decide the matter there; for the true Russian boasts that he wants to have as little as possible to do with English trade or with England in any shape.

Russia has no export trade in manufactures, so the "illustration" is but a very feeble one. The price of Russian wheat would not be advanced one farthing to the British consumer when the happy time arrives to Russia that she shall be able to compete with England in manufactures, if England were to put a corresponding duty upon these goods of the future. And now comes his great "practical illustration"—he appears to have worn out the "theories"—

Again, let us take the United States, the best practical illustration of all. The Republic is still strongly Protectionist, burdening English manufactures with high duties, while freely exporting her own manufactures not merely to neutral markets, but to England also. Even as Belgian coals have come to Newcastle in defiance of probabilities and proverbs, so have Massachusetts calicoes found their way to Manchester, where they stare out of countenance the best productions of the Blackburn and Preston looms. Such a state of things is really very aggravating, and almost adds "insult to injury," but let us see what is the remedy advocated by the friends of Reciprocity. Imposing a duty on American cottons might do little harm, but also it would do no good. That is not the penalty which would make the United States modify their whole tariff in our favour in a Free-Trade sense. Nothing less than a duty on all American products could be expected to move them; and are we prepared for that? Are we prepared for an import duty on American wheat and flour when our poorer classes complain of bread being already too dear; for a duty on beef, mutton, bacon, cheese, when our middle class have mainly these imports standing between them and much higher prices than those they now grumble at; for a duty on raw cotton, when Lancashire complains that her manufacturers can hardly make both ends meet as it is? Is this what Reciprocity would do for us?

I have certainly never heard any complaints *against the cheapness* of American food, and it is idle to endeavour to divert the attention of the working classes by this call about levying duty on food for the purposes of revenue, which only lightens the expenses of the shopkeeper at the expense of the manufacturer and working man. What we want is to levy duties to prevent manufactures from America and other countries being sold to our customers as British goods, and such duties as will ensure the employment of our people. This is the "penalty" which would be considered by the United States themselves, and all other nations, as perfectly fair for us to impose: and we might go a step further, and get all our colonies to put a differential duty on all non-British imported goods.

The Americans are now selling agricultural implements in Russia, Germany, and other countries on the Continent of Europe at prices only a trifle higher than they can be purchased at in Great Britain, and this notwithstanding the high import duties charged by those countries. The protected *consumer* even then does not pay for the goods more than the magnanimous Briton who *loses the duty to the revenue*, and the American manufacturer *gains it* for *his individual pocket*. Our writer, evidently well satisfied with himself, if not with the state of trade, says—

We thus reach by an easy stage the very kernel of the question. The radical fault and weakness of the reciprocity theory is that it altogether leaves out of consideration the most important factor in the problem—the consumer. Every article of foreign produce imported is a clear gain to the consumer, since it would not come to his market at all unless either his own country did not produce it or the producer asked too high a price. It does not matter whether the commodity be food, clothing, or luxury, if the consumer buys it cheaper from the foreigner than from his own countrymen, in that capacity and to that extent he gains.

This is the John Bright theory, "buy in the cheapest market and sell in the dearest." Very pretty commission agency theory, but where is the money to come from to "buy" *at any price* if our money-producing power is taken from us? The consumer who "gains" by the destruction of English manufacturers, by buying "cheaper" from the foreigner, will find the gain drawn upon largely in the shape of poor-rates, new workhouses, and gaols that have been the outcome of his system of gaining. It is likely that one class of consumers, the brokers, commission agents, shopkeepers, professional men, article writers for the Daily Telegraph, retired Cobdenites and Brightites, *et hoc genus homne*, may for a time have "gained," but those at whose expense they have done it—the manufacturers and the *working classes* of England—will have something to say in the question ere long.

Our writer now goes to agriculture:—

This was the principle that swept aside the Corn Laws, despite the pleading of the farmers—no unimportant industry—for reciprocity. But the consumers do not constitute a special or isolated class in the community. Every producer is also a consumer, and how fares he in the discussion? The result to him is simply this, that the cheaper he buys anything, no matter whether raw materials for his special industry, or the cost of his individual maintenance, at so much the less cost is he able to produce, and, therefore, so much the better is he qualified to meet his rivals in the fierce competition of the world's markets.

The former suffers vastly more from rents increased to the highest pitch than by a 10 per cent. duty on French kid gloves and sour claret. At present he is grumbling about low prices, but when the great manufacturing centres are partially idle the demand for his production is lessened, and the prices thereof lowered by such diminished demand. The former is not the person affected by questions of competition in the supply of food, it is *the landlord* and unless our old manufacturing status is restored *lower rents* must be *the result*. It is idle to suppose that in the nineteenth century the "hewers and drawers" can be made to support *all* the burden. One writer goes on to remark—

Wages have been reduced, and probably must be cut down lower; but if the working man struggles against these reductions in consequence of the expense of living, how much less able would he have been able to live had import duties added 10 or 20 per cent. to the value of everything he consumed? Cheaper living is one source of the superiority which his Continental and American rivals possess, and to make bread, meat, and other necessaries dearer would simply handicap him more than ever in the competition, and, therefore, prolong those disadvantages of his position which reciprocity professes to be designed to remedy. Mr. Forster has thus no difficulty in showing that if this vaunted means of relief to our industrial ills could confer no benefit on the manufacturer it would do little for the working man.

The working man struggles against the reduction in wages, more because of the increase in rents and foreign competition; his cost of living is not so greatly enhanced. By the mouth of John Bright he has been told he should have a "free breakfast-table;" and, unfortunately, it has become so free in many thousands of homes that there is no breakfast on it, and the owner no means of buying one. This is what makes struggles and strikes; the working man has been led to suppose that the great free trade movement was to cheapen his food, give him the big loaf, and make him happy generally, but when he finds that instead his *rent is higher*, his *food dearer*, and that he is subjected to *unlimited foreign competition* in regard to his wages, then he organises strikes to protect himself, a necessary consequence when he finds he has been humbugged, and in the end he will succeed. This country is differently circumstanced in its elective arragements to what it was when Mr. Gladstone and others pushed away protection *on manufactures*. The article continues—

Let the point be looked at how we will the introduction of reciprocity is a principle of State action would simply lead to a war of tariffs, by which each nation would jealously shut out as much of the products of all its neighbours as it could, and content itself with consuming its own. Of all countries in the world Great Britain is the least fitted to take part in such a Chinese policy, for she is by the nature of things dependent upon other countries for the very means of existence.

England, of all other countries in the world, with her vast colonies, is the country best able to demand reciprocity in manufactures, her dependence for existence is limited only to her purchasing power, which is derived from manufactures chiefly. The article continues—

Reciprocity, applied to Russia and the United States, means permanently dearer bread, more pauperism, less wealth, and, consequently, less constant and less lucrative employment. The nation would not be enriched by these means; it would only be impoverished, for its wage-fund would gradually diminish without a single market being gained. To impose countervailing duties on foreign manufactures would excite the hostility of the agricultural interest, which would ask why it alone would be sacrificed to foreign competition; while to lay additional duties on all foreign commodities alike, including the necessaries of life, would provoke the hostility of every household in the kingdom.

Reciprocity in manufactures means nothing of the kind. So long as we have money to buy with those who have surplus food will always be glad to compete with one another to supply us with it; but it is difficult to discover any meaning to the writer's assertion that the "wage fund" would "gradually diminish." One would think the contrary would be the effect if we manufactured for ourselves instead of encouraging foreigners to manufacture for us. "Countervailing" duties upon foreign manufactured goods would neither excite farmers' hostility nor would they increase the cost of "necessaries," but they would diminish the provocation of most "householders" by lessening their rates and taxes. The writer concludes—

What is really practicable is, first of all, by friendly negociation with other States, on the basis of existing Treaties, to prevent any needlessly vexatious interference with our trade and industries; and next by cheaper production to offer what every consumer is always glad to get—manufactures of good quality, and more moderate in price than others can supply. That English makers are undersold in the United States may be the fault of hostile tariffs; that they are underbidden in their own home market by Americans is a scandal only to be explained, as an eminent Manchester man puts it, by the "lower wages, longer hours, and closer application" to work of other countries. The cure for this is in our own hands, and employers are gradually and with infinite pains striving after it. The cure for the other is in the nature of things slow, but it is certain, being, in fact, simply equivalent to the spread of intelligence. Neither the French nor the American artisan will long submit to be taxed for the benefit of home capitalists when he has once mastered the elementary fact that taxation shuts out from his use better and cheaper goods than theirs. Pending the arrival of this necessary enlightenment the English artisan will we may be quite sure not be so ill-advised as to fall into the snare which ignorance and selfishness have between them laid for his fellow-labourer abroad.

The practical nature of this proposal may be judged of by the unsuccessful attempt made by our present Government to induce our dear friend M. Leon Say to take off the bounties on sugar sent to England. Not only do these friends send their manufactured sugar here free of duty, but they gave a Governmental bounty to French manufacturers to compete with English manufacturers, in order to transfer the trade to France, and ruin the English manufacturers, and these are the sort of people likely to listen to "friendly negociations." The existing treaties will not be long in existence. "Monsieur" wants the rind as well as the juice. As to the English makers being "undersold," whether this be a "scandal" or not, it is a *fact*, and shows plainly enough that onesided Free Trade is a fallacy; indeed, where would be the necessity for "friendly negociations," &c., if the working of this wonderful onesided machine was beneficial to us? The French and American artisans are willing to "submit" to supplying themselves so long as they are provided with the means of so doing, but I doubt if at any period in their history they would have submitted to being sat upon by such folk as Bright, Cobden, Gladstone, and Co., and brought into direct competition with other artisans who could live on about half the price that they could, apart from the question of *rent*. The English artisan will benefit by the school board it is to be hoped, and at the next general election will make his voice heard for his own interests.

I am afraid that I have already trespassed too much on your space, but I would like to remark in reference to the tone of the Daily Telegraph writer, which would seem to imply that this reciprocity movement was a new thing, and unknown to working men, but I may say that in 1866 an association termed the "Association of Revivers of British Industry," James Roberts, president, published several works upon this subject—"Free Trade a Gigantic Mistake," "The Poisoned River," &c.; but at this time foreign competion had not fully matured, and the "Revivers" (among them Roberts, Admiral Elliot, and others) were classed by the great John Bright among the noble army of "knaves and fools," and the association was perforce obliged to postpone its efforts till such time as people were open to think for themselves, and not through oracles.—*Jan.* 23. N. M. M.

OUR EUREKA, NEVADA, CORRESPONDENCE.

THE NEWS OF MANAGING DIRECTOR PROBERT'S SUCCESS RECEIVED WITH REJOICINGS AT EUREKA—THE RICHMOND WORKS IN FULL BLAST SINCE THE 15TH OF DECEMBER—NEW FURNACES DOING WELL, AND REALISING EVERY EXPECTATION OF MR. RICKARD—COLD CHRISTMAS AT EUREKA—YIELD OF THE DISTRICT FOR 1878 ESTIMATED AT $10,500,000, AGAINST $272,000 PAID OUT FOR ASSESSMENTS—YIELD OF THE DISTRICT FROM 1870 TO DATE $54,000,000.

[FROM OUR RESIDENT CORRESPONDENT.]

SIR,—Since it may interest your English and other readers—the members of the lately discomfited commission too, perhaps (?)—to learn in what manner the news of Mr. Probert's victory was received here I append a few remarks relative thereto, coupled with the intimation that until the present inopportune moment I have, much to my regret, been unavoidably prevented from conveying to the Journal something interesting. However, as there are a large number of persons in the world to whom the truth in any guise is never welcome, especially when it favours the cause of some hated and victorious rival who escaped their toils, there will, I presume, be as loud a howl go up from certain quarters as there did from Campbell's Wolfe, on "our Alaska's shore," in deprecation of my reverting at this late hour to a question which, like Sir Coldstream, "is used up," and which ought to be forever more consigned to the *limbus factuorum* of distasteful things. Perhaps it ought not to be mentioned now, and it is likely that I should allow the subject to descend to where it properly belongs, only that it affords me pleasure to post the gentlemen of the Commission as to the manner in which their arduous labours have been appreciated in a quarter where they would have your readers believe Mr. Probert was heartily despised. However, to institute a not very elegant comparison, I shrewdly suspect that if the vote of the Richmond shareholders had placed the shoe upon the other foot, and sustained the committee by finding the former guilty, as charged in their ponderous report, the rejoicings of both themselves and their too credulous supporters would have been dinned into our auricula appendages *ad nauseum*. Had such, unfortunately, been the case who is there of those who have read the Journal during the past six months who doubts that that Rupert of letter writers, whose ready and fluent pen attacked whomsoever had the temerity to use ink in defence of the man whom he so savagely abused—who doubts I say that, under such circumstances, he would not again seek to monopolise *ad infinitum* the Supplement to your valuable paper in giving expression to the exultations of both himself and his friends? It would, no doubt, be a very agreeable pastime to keep feeding the flame by recording the great services which both himself and his two worthy colleagues had so disinterestedly rendered the Richmond Company by their successful impeachment and removal from office of the bad wicked man, whose greatest crime was that both his genius and his ability had helped to fill the coffers of his company with the bright gold of Eureka in a manner in which they had never been filled before. Then, again, his position was both an exalted and a comfortable one, and one, too, which would exactly suit the couple of gentlemen who modestly thought themselves peculiarly fitted for it. How modest! Fitted for it? Yes; their attainments, too, might preeminently fit them for unfolding the idiomatic beauties of the Sanscrit or for the more arduous task of deciphering the hieroglyphical characters which adorn the Aztec ruins of Mexico. Poor deluded gentlemen! How will they feel when I tell them that here, where they thought the resident manager was hated, the news of his victory over their wily machinations was hailed with every outward demonstration of pleasure by the citizens of this district, and that not one dissentient voice do I remember to have heard, nor one that approved of their questionable undertaking. The rancorous feelings controlling these gentlemen were well known and understood here.

English love of fair play, however, triumphed over all opposition, as it always does. "The best laid schemes o' mice and men gang oft agree," says the poet, and the Richmond shareholders are entitled to much credit for having so seasonably nipped in the bud the disreputable scheme so well and sedulously concocted, whereby they (the committee) had hoped to aggrandise themselves at the expense of a deeply injured and innocent gentleman. The shareholders' honourable acquittal and sustenance of Mr. Probert was as noble as it was praiseworthy and deserved, and, though nothing more than every right thinking man expected, the act itself will largely redound to their benefit—to say nothing of the precedent it establishes, or of the striking illustrations it presents of British justice and love of fair dealing. But it is not improbable that if Mr. Probert had been less successful, or exhibited less interest in the affairs under his control, or made himself less conspicuous for keen judgment, sound sense, and ability that the conspiracy to dethrone him might have succeeded. Success, however, is always the measure of one's ability—for ability in any of the walks of life is essential to enable a man to cope with the difficulties which sometimes beset him, and which without his possessing mental resources to check or remove them, would master him, and in the end drive him from the field baffled and beaten by the intervention of what he was not able to prevent. Such has not been the case with the Richmond managing director; hence it is gratifying to his friends, as it must be to himself, to know that his ability like his integrity remains unquestioned.

Had the gentlemen of the Commission but known the character of the man whom they prejudged, and whom in their vanity and egotism they had hoped to crush, or known anything of his wealth of resources, the documentary evidences of proof and reputation which he possessed, it is safe to say that they would have hesitated before daring to beard the lion in his lair as they did. They will, however, not be likely to forget the undertaking, and it yet may be of some service to them to remember it.

What, I would like to ask, would the Richmond have been to-day had not he fostered it as he had done, and kept adding location after location, both linear and laterally, to the original purchase? Well, there simply would be to-day no Richmond in the field. No dividends, no works, no wood ranches—neither would there be need for the abortive services of a $30,000 Commission to libel the manager; nor, indeed, would there scarcely be need for anything else, for it is extremely doubtful if it would have an existence except in the misty remembrance of those whom in its pristine career associated their fortunes with it.

Yet in the face of all these undeniable facts the man whose fostering care has made the Richmond what it is—the finest, the most extensive, and the most prolific property in the United States, if not in the world—has been subjected to the grossest abuse and revilings; his honour impugned, his character blackened, his motives distorted, and his every thought and movement so fiendishly misrepresented that he was made to appear a walking embodiment of Mephistophelian wickedness. But, as the adage hath it, "It is a long lane that hath no turning;" and in this connection I can, at this distance, picture to myself the torturing uneasiness that must have got possession of his accusers when Mr. Probert announced it to be his purpose to visit London, to refute their long array of charges against him, and I can also understand that when he did run across the Atlantic his appearance must have caused as much commotion in the ranks of his traducers as did that of Alonzo the Brave at the bridal feast. His reply to the gentlemen of the Commission is as able as it is interesting and exhaustive. Bristling with facts and figures compiled from authentic sources the volume as printed will prove a highly valuable addition to the records of the office, and likewise prove a *vade mecum* of no small interest to the general metallurgist and mining man. But if his reply to the Commissioners' charges is good, his speech in response to their rejoinder—their last shot—wherein he defends his management is simple, admirable, critical, explanatory, defensive, and convincing, because truthful. He justly poured out the vials of his pent-up wrath in withering sarcasm and ridicule upon the devoted heads of those who were instrumental in so shamefully arraigning him at the bar of public opinion on indictments and counts so flimsy and destitute of foundation that they fell to fragments in the hands of the confounded triumverate the moment the proper analytical test was applied to them.

To show the value attached to Mr. Probert's reply and speech on this coast I may mention that within the past three weeks I have had no less than four letters addressed to me from different sections—one from Mr. Whitehill, State Mineralogist of Nevada—asking that, if possible, I forward the writers a copy of them. This I have not been able to do, owing to the few that have been received here, those who have been favoured with copies not caring to part with them. But, enough! Mr. Probert may well be proud of his victory—proud of having vindicated both his name and his honour from the foul aspersions sought to be cast upon them.

The new works were set in motion under very auspicious circumstances on the 15th inst., since which period there has been considerable bullion moulded, the new furnaces having thus far fulfilled every expectation entertained of them by Mr. Rickard. Prodigious in capacity, as illustrated in my last letter, they turn out large quantities of bullion, which is being refined almost as fast as produced—the refinery and its appurtenances, cupels, &c., having been placed in excellent condition in the interim between the shut down and the start up.

There is now no doubt but the new furnaces will give a good account of themselves, as indeed they ought, for there has been no little care bestowed upon their construction. In fact, ever since he commenced to rear the present upon the ruins of the former structure Mr. Rickard has been most indefatigable in his endeavours to render both complete and convenient every portion of the new works; and that he has succeeded is evident from surrounding appearances and from the diminution in the number of hands employed compared to what there used to be formerly. It is my conviction, as it is the conviction of the company's able foreman, Mr. A. E. Titus, as well as of Mr. Rickard, who with the former know about all such things, that the saving to be effected in the matter of labour and in the largely lessened consumption of fuel for steam purposes, will at the end of the year aggregate more than the amount expended in constructing the present works. This will be gratifying news for shareholders, and will be, I have no doubt, equally gratifying to the managing director, who has been so ably represented in his absence by Manager Rickard, who, to say the least, is entitled to the thanks of all concerned for his faithfulness and attention to the most trifling, as well as to the most important, details of the company's affairs.

The new works are much admired by visitors, and justly, as they present a fine appearance in point of architecture, and are alike creditable to him under whose supervision they were built, creditable to the company, and creditable to the reputation of Eureka, which can now boast of having within its limits the most complete smelting and refining establishments to be found on the Pacific Coast and, I doubt not, in the United States.

Winter's icy regions are upon us at last. That time-honoured individual—dear, benevolent, old Santa Claus—so dear to juvenile recollections, made his annual visit this season in most inclement weather, the snow and ice vieing for supremacy, while the mountains round about presented a picture of purity, mantled as they were and are in their fleecy covering of the beautiful. Wrinkled and hoary Old Prospect, too, wears a most winterish aspect clad in his "ascension robes" as, like a mighty monarch of some Arctic clime, he looms up in the background, an indifferent spectator of the hyperborean looking landscape encircling him.

The mining outlook of the district is very promising, and the news which reaches us from outlying districts is also most encouraging. Taken as a whole the mining interests of Eastern Nevada appear to be in a very prosperous condition indeed, and with the disappearance of winter it may reasonably be expected that a much better state of things will prevail. With the advent of fine weather transportation and travel will increase, many industries now dormant or but little followed will be resumed, new enterprises started, old ones galvanised into life, new mining ventures inaugurated, the flow of bullion augmented, and the general prosperity placed upon a surer and firmer basis than ever.

The mines of this district the past year produced in the neighbourhood $10,500,000 in the aggregate. So says the Eureka Leader, which has drawn its deductions from the bullion shipments for 1878. If these figures are correct they overtop by $500,000 the estimate which I made at the beginning of the year. I prophesied $10,000,000 for the year, while others more sanguine—among them the Editor of the Leader—estimated the yield at a million a month, and he now intimates that his estimate would have been correct had not the Richmond conflagration checked the production in that direction for one-fourth of the year. And when I think over the matter I do not know but he is right, for the destruction of the Richmond furnaces exercised no little influence in checking the production of the district for 1878. Well, $10,500,000 is not to be sneezed at after all is said and done, and if, as asserted by a San Francisco paper, in a table of assessments levied by mining companies during the last year, we have paid $272,500 for that period in assessments we could well afford it, seeing that we derived $1,800,000 from dividends from one company alone in that time, the Richmond and other companies not being accounted for at all. The output for 1878 is the largest since the discovery of the district, and with previous returns approximates $54,000,000 as the yield of the mines of the camp since the winter of 1870. Who says that Eureka district is not growing apace, or that its mines are not veritable Golcondas of mineral wealth? It is little wonder that the Base Range is so prosperous, especially when we come to understand that the disbursements for labour and supplies paid out and circulated among our people in the year now nearly at an end will aggregate more than $3,500,000. This is a goodly sum, which has stimulated many industries and local improvements, and given an impetus to the architectural adornment of the town.

The outlook for 1879 is still more promising than it was at the beginning of 1878, and look where I will my vision is bounded by the brightness which betokens and precedes a year of unusual prosperity in both mining and business enterprise. J. D. POWER.

Eureka, Nevada, Dec. 31.

MINING NOTES FROM UTAH.

COTTONWOODS.

The Emma, under the management of Geary Cullin, is steadily improving on the Bay City Tunnel level.

Toledo has reached a depth of 400 ft., and extracts very valuable ore; an 80-horse power engine does the hoisting.

Flagstaff is working 70 men on deadwork alone. This mine has produced to my knowledge more than $3,000,000, or 600,000*l.* sterling.

Oregon (owned in London, Ontario), Gruppe Mines, is developed by a shaft 100 ft. deep, and a level 480 ft. long on the vein; the vein is a fissure vein, and varies from $40 to $800 in value per ton. They have lately erected a 25-horse power engine, and are now sinking the shaft 150 ft. deeper.

Carbonate, or Kessler, Mine has produced in about one year's time $250,000, and has been sold lately to Messrs. Rob. Lenox, Belknap, Lenoxes, Rhemsen, Nathan, T. G. Brown, A. Woolff, Steward, Thomas, and Kreislmer, of New York, for $165,000 cash, and one-tenth of the stock.

WEST MOUNTAIN.

The Old Telegraph is producing, with a force of 100 men, 100 to 150 tons of ore per day. This mine has only reached as yet a depth of 420 ft., yet the same has produced about 400,000*l.* worth of ore, and has still double that in sight. This vein has been traced for a distance of more than two miles.

Stewart, situated in Muddy Park. This mine has been sold to Gilmer and Salisbury for $150,000; the mine produces at present daily 40 tons of gold ore, worth 4*l.* per ton,

Peabody, situated above the Stewart, and working on the same vein as the Stewart.

Jordan Mine, under Wm. McQueen as captain, re-struck the vein last summer, and produced since then 40 tons of ore daily.

Last Chance, a very good mine, but lays idle. I must here remark that the statement in the *Mining Journal*, dated Dec. 14, 1878, about the Last Chance extension (belonging to J. Tiernan) is greatly exaggerated. Although the mine is a good one the produce, dimensions of vein, and development are seen through a magnifier, as I know the mine and mines very well.

PARLEY'S PARK.

Ontario Mine has reached a depth of 500 ft.; the vein is opened on its strike, east and west, for a distance of 1000 ft. The mine has two shafts, which are connected by a cross-cut of 247 ft. in length on the 500 ft. level. A fire occurred on Oct. 19, which destroyed the engine-house, with all the hoisting and pumping machinery. Reconstruction was commenced immediately, and all the works were completed before Dec. 1, better than they were before. The new shaft has two hoisting compartments, 4½ by 5 ft. each, and a 5 by 7 ft. pumping compartment. The cages are safety-cages.

Adjoining the Ontario is the Switzerland, Banner, Parley's Park, Last Chance, and McHenry Mines. The latter is developed by a tunnel following the vein for more then 1100 ft.

Salt Lake City, Dec. 30. W. BREDEMEYER.

COLORADO UNITED MINING COMPANY.

SIR,—The directors of the Colorado United Mining Company (Limited) desire me to inform you that they have read with great surprise the paragraph in last week's Journal, which you have reprinted from the New York Engineering and Mining Journal. It is not true, as stated in that paragraph, that the Colorado United Mining Company have had to repurchase the Terrible Mine, in order to get a title to it. The reports in your own columns set forth the facts on this head, which the directors have communicated to the shareholders.

That a "job" has been perpetrated against the company, of which some of the company's "officials" are cognisant, is an allegation which the directors consider ought not to be circulated without a better reason than that it is said to be "whispered" among anonymous persons who are supposed to be generally well informed. If any evidence in support of so grave a charge be laid before the directors they undertake to sift it carefully, and in the event of its proving correct they will inflict upon the offenders all the punishment in their power.

The directors request you will give the same prominence to this note as you have given to the paragraph upon which they have commented.—*London, Jan.* 22. H. J. MACRAE (for Secretary).

COLORADO UNITED MINING COMPANY.

SIR,—I enclose a copy of the last circular issued to the shareholders, and will thank you to publish the same.

London, Jan. 22. H. J. MACRAE (for Secretary).

To the Shareholders of the Colorado United Mining Company.

The engagement of the company's superintendent having terminated, the directors have instructed the secretary to proceed to Colorado and arrange with Mr. Hamill for the future management of the company's property.—*Jan.* 7. F. ANDREWS, Secretary.

MINING MARKET NOTES.

SIR,—The market for mining shares has been pretty quiet, and nothing of importance has transpired with the exception of a fall in Richmond shares, which is no doubt accounted for in the decreased return. A large number of shares changed hands on Tuesday and Thursday. Great dissatisfaction has from time to time been expressed because the usual weekly telegram is not made known on the day of arrival (Tuesday), and during this week comment has again been made on the subject. It is held by those who are in a position to judge that information bearing on the return must be known in London as soon as the telegram arrives, if not before, how or in what way it is gained, if it is really known, is impossible to say; it may be transmitted from America or leak out of the telegraph office, Although a code is used by the company, there would be little difficulty in translating it; a few weeks' observation of the telegram would be a sufficient help to grasp the meaning of succeeding ones. If the company had a changing code, the chances of others than the officials reading telegrams would be very small indeed. But the better and simple method would be to publish the telegrams as soon as received, so that no undue advantage could be taken of those interested in the shares, whether dealers or shareholders. Nothing official is known about the dividend; it is confidently asserted in some quarters that the usual dividend will be paid. Next week's return it is expected will be satisfactory. When the whole of the furnaces are at work again, and on high-grade ore, larger returns may be looked for than have ever been made.

EBERHARDT have exhibited firmness throughout the week, with an upward tendency; as a speculation this is one of the best. Should success be met with SOUTH AURORA shares will be in demand. If Eberhardt are worth 4*l.* as a speculation, South Aurora are surely worth 4*s.*; these shares are well worth buying and holding. There are very few shares on the market, and an enquiry would cause them to advance. FRONTINO remain steady; this is a really sound concern. The mine is only now being properly opened up; I hope to see before long regular dividends being paid. DON PEDRO are firm at quoted prices; this mine is still attracting public attention—the past history and present prospects commend it to speculative capitalists. COLORADO have slightly improved; so far there has been great disappointment on all hands since this company was reconstructed. There has been abundant evidence given of the value of the mine, but it has not been sustained by results. Scarcity of funds is no doubt hampering progress; with ample funds and good management Colorado ought to be a great success.

The following are the closing prices:—Almada, ⅛ to ¼; Colorado, 1⅜ to ½; Chontales, 7-16ths to 9-16ths; Cape Copper, 29½ to 30½; Don Pedro, 19*s.* to 21*s.*; Eberhardt, 3¾ to 4; Frontino, 2 to 2¼; Kapanga, ⅜ to ½; New Quebrada, 1⅜ to 1½; Pestarena, ⅛ to 3-16ths; Port Phillip, 7-16ths to 9-16ths; Richmond, 9⅛ to 9⅜; Rosea, 1*s.* to 3*s.*; St. John del Rey, 250 to 260; Sierra Buttes, 1½ to 1¾; South Aurora, ⅛ to ⅜; S. B. Plumas, 2⅜ to 2⅞; United Mexican, 2¼ to 2¾; Virneberg, —— ; Javali, 4*s.* to 6*s.*; I.X.L., ⅛ to ¼; Exchequer, ⅛ to ¼; East Van, 1½ to 1¾; Great Laxey, 16½ to 16¾; Marke Valley, ⅛ to ⅜; Roman Gravels, 6¼ to 6¾; South Condurrow, 10½ to 11; South Frances, 6½ to 7; Tankerville, 2½ to 2¾; Van, 16¼ to 16¾.

WILLIAM GABBOTT,
8, *Draper's Gardens, London, Jan.* 24. Stock and Share Dealer.

SOME FOREIGN MINES.

SIR,—Since the Richmond storm has blown over our eyes are turned to a still more pretentious affair—the Colorado United. Is this gigantic venture going to prove a heirloom? Certainly the reports, as published in the Journal, leave much to the imagination. Every other foreign mine publishes the amount of ore produced, or the value produced, but the Colorado manager's reports repeat with tiresome iteration "10 inches rich mineral here, 6 inches there, splendid! magnificent!" &c.; but no ore seems to come out, and it seems as if he cares not to take the said inches out of the mine, lest there remain no inches to boast about. It is high time that shareholders should know what is being done. Is the promised dividend going to be paid? Is there a profit made or is there a loss? No one knows apparently. What a splendid mine Pestarena United is! what handsome dividends such a mine would have paid in American hands! But it is only another magnificent property utterly thrown away through British blundering and stupidity. That the drainage shaft on which the existence of the mine depended should have been left totally unprotected from such an accident as lately happened shows either gross ignorance or gross carelessness on the part of the mining captain in charge. No doubt the accident occurred through a sharp frost. I'll wager the cast-iron pipes are not even protected by non-conducting packing. Is the captain aware that cast-iron flanges can be strengthened by shrinking on wrought-iron rings? Has he done so on replacing the broken pipes? The small yield of gold from such lodes can easily be explained. Scientific chemistry is not a strong point with the majority of Cornish mining captains. In their hands the process is laborious and tedious, and conducted entirely by rule of thumb. The costs are enormous, and why? With abundance of everything, and cheap labour, why is this splendid mine in difficulties? Its produce of gold per ton is nearly double that of the St. John del Rey, and what a pitiable spectacle the Pestarena presents to the world of English mining mismanagement. —— NIL ADMIRARI.

COAL MINING AND COLLIERY MANAGEMENT.

SIR,—When some of our best seams of coal are approaching the point of exhaustion, and the depth from which coal is raised is gradually increasing, it may be well to consider the processes by which coal is got from the mines, and how it is treated on the surface preparatory to being made a marketable commodity. It should be borne in mind that we have to compete in the markets of the world with rivals (more so now than ever) both in Europe and America. Though our coal production is still increasing yet other coal producing countries, as Germany and America, are making rapid strides in raising and exporting coal, as well as in the manufacture of iron and steel, and machinery of all kinds.

The colliery interest is now no doubt suffering from the abnormal state of trade in 1872 and 1873, and the inflated prices of those years. This period of prosperity was the inciting cause of so much capital being expended in new collieries, and the extension of old ones—the result is over production, or rather large powers of over production, of coal; low prices for coal; and the closing of many mines. Added to these are the legislative restrictions imposed on the working of mines, and the higher royalty rents paid under new leases; it will thus be seen that colliery proprietors are placed under great disadvantages at the present time. Coal miners have also suffered, many having lost their employment, while the employed have to submit to prices as low, or even lower, than those paid in the year 1871. The season of high prosperity, together with strikes, has had another pernicious effect in bringing unskilled labourers into the mines; the system of getting coal now may be described as that of smashing the coal, and working and filling it in the shortest possible time without regard to making a marketable commodity. This complaint is now generally made over the North of England, the Midlands, and other coal fields of the want of skill in miners compared to that shown 40 or more years ago.

This charge brought against coal miners will have the effect of bringing into use labour-saving appliances for getting and conveying coal underground. Coal cutting machines, though being but tardily introduced, must inevitably become general, because in them we see the elements of a coal-getter which will produce the greatest quantity of large marketable coal, minimise the production of small coal, and in connection with air compressed hauling-engines reduce the cost of coal delivered into wagons on the surface to its lowest limit. These hauling-engines, it is expected, will supersede horses and putters in mines; we have no reason to doubt this if workings can be laid out on the long-wall face system, and the works are concentrated into the smallest area—not scattered over all quarters of the mine, as is often seen.

The present depression of trade will not be without some good result if it stimulates to the adoption of labour-saving appliances, the lessening of the cost of getting coal, and to making a better and more marketable article, enabling us to compete successfully in the markets of all parts of the world.

It is highly important that mining engineers should avail themselves of the experience of those in other districts, both at home and abroad. As foreign engineers have availed themselves largely of the experience of our northern engineers, and in many cases have improved upon them, so ought we to know what improvements have been made in foreign countries, and what is going on generally in all colliery districts. In my letter of last week I referred to the much-needed utilising of small coal, especially in the North of England coal field, by manufacturing brickets of artificial fuel from it. This would furnish a cheap fuel for house consumption, as well as lighten the general cost of working coal. In the same issue of the *Mining Journal* will be seen a drawing and description of a machine which appears to be admirably adapted for making such brickets. It is much used in Belgium and France, and made by Messrs. Yeadon and Co., Engineers, Leeds.

Coal of a very impure quality worked in Saxony, containing 25 per cent. of ash, is prepared for the market by a jigging process. Six different sizes of coal are made, exclusive of dirt, and when sent away the coal contains not more than 7 or 8 per cent. of ash, a proportion which will be found in many of our steam coals. Those having impure coal of this kind to deal with may avoid much expense and loss of time in experimenting if they become acquainted with such like modes of dealing with a large quantity of impure coal in that particular mine and in other mines.

Much attention is given now to the prevention of waste in screening coal, not only on the screen, but in its fall from the screen to the bottom of the wagon. Instead of falling several feet it is at a few collieries in the North received on iron trays, on which it is lowered into the wagon without breakage.

It is well if our engineers are making themselves acquainted with all improvements in mining, the application of machines to cutting coal, hauling underground, the utilisation of small coal, the coking of coal, using waste heat from ovens to heat boilers, brick works, &c., and the screening of coal properly. This would enable them to advise in the selection of sites and the construction of works, and in daily management producing an article in the most perfect marketable condition at the lowest cost consistent with the conditions existing in the mine.

The demand for coal is still increasing all over the world, wood as fuel is becoming scarce; steam-power and gas making are also on the increase, which account in part for the larger consumption of coal. Steel is now extensively used, and seems destined to supersede iron for railway, ship-building, and other purposes. The production of Bessemer steel in the year 1878 in Great Britain was about 850,000 tons, and of Siemens steel about 150,000 tons. In the

year 1870 the production of all steelworks was about 230,000 tons. Several new steelworks commenced operation in 1878, others are being extended, and new works are in contemplation. The capabilities of steelworks seem destined to be on a very extensive scale of production. At some works, as at Eston, Barrow, &c., in England, and other works in France, the pig-iron is run from the blast-furnaces direct to the Bessemer converters, thus dispensing almost with the use of fuel. In all cases the saving of fuel and of labour in making steel as compared with iron is so great that steel rails are now manufactured at a cost very little more than that for ordinary iron rails. Doubtless if the capital were at hand many ironworks would now be in a process of transition from iron to steel making. One effect, however, of this change will be to lessen the demand for coal, and to throw out of employment a large number of ironworkers, whose only hope of subsistence, we fear, would be in the field of emigration. Of late years the burdens and perplexities of colliery owners have been hard to bear; we trust, however that better times are dawning upon us. Though the great prosperity of six years ago may never again be experienced, and it is better that this should not come to pass, we do hope that this period of adversity may incite us to increased exertion in putting our works in order, enabling us to hold our own by the means indicated in this letter, and will stimulate capitalists to exercise continued economy, and adopt mechanical appliances for coal cutting, hauling, and other processes; and will serve to remind coal workers of the necessity of being industrious and careful in times of prosperity as well as in times of adversity. M. E.

EXPLOSIONS IN COAL MINES.

The following letters were addressed to the Editor of the Times:—

SIR,—Prof. Tyndall exhibited at the Royal Institution an electric lamp which seems likely to fulfil the desiderata sought for in the attempt to light coal mines by electricity without the risk of exploding inflammable gases. In my last letter I suggested that possibly platinum foil kept at a state of white incandescence by electricity within a strong glass tube hermetically sealed might answer, but the lamp I now speak of arranged in the same way and on the same principle would manifestly answer the purpose perfectly. This lamp was made, I believe, by Mr. Ladd, of Beak-street, Regent-street, and consists essentially of a small piece (in this instance about 2½ in. long by ¼ in. diameter) of the metal iridium, supported at either end by a little socket of platinum, and then mounted on an upright placed in the path of the magneto-electric circuit. The moment the electricity passes through the iridium it becomes red hot, and then immediately, like the shooting of a rocket, blazes out into a magnificent rich light like the sun. The advantages of this light are that it requires no adjusting machinery; once fitted it is always ready and requires no renewing. It will illuminate as effectually in a closed glass vessel as in the open air, and, consequently, might thus be used with perfect safety in the most explosive atmospheres. Thus arranged it could be moved to any part of the mine, and placed wherever light was needed; and, seeing the great brilliancy of the light, there can be little doubt that the reflectors or mirrors might be economically employed as adjuncts to direct a stream of light into any dark corner. It is probable that the coal dust floating in the air of the mine would act like the opalescent shade, and serve to diffuse the light and diminish shadow.

I venture to offer these additional suggestions in the hope of stimulating others more able to work up this important question.

THOMAS HAWKSLEY, M.D.

Grosvenor-street, Grosvenor-square, Jan. 20.

THE LIGHTING OF MINES.

SIR,—I noticed in the Times of Saturday a letter from Mr. Thos. Hawksley, M.D., advocating the use of the electric light as an illuminating agent for mining purposes, and, if none of your more able correspondents have replied to Mr. Hawksley's letter the following remarks will, perhaps, be considered worthy insertion. Although the motives of your correspondent are most praiseworthy in seeking to call attention to the above subject, and the ideas which he has advanced are exceedingly ingenious, I am afraid there are practical difficulties which render the adoption of his proposed method of lighting quite impracticable in the present condition of mining.

The tortuous ramifications of mines are generally many miles in extent, and the roads and working places are frequently obstructed and disturbed by the placing and replacing of timber, by relaying the roads, and by the passing of horses and loaded and empty trams, and also by occasional "falls" from the roof and sides. The headings and working places are generally very narrow and confined, and there is also frequently little room between the roof and the floor, and, in addition, the roads and headings are much polluted with mineral water and sludge, or, in dry collieries, with great quantities of coal dust.

I am well acquainted with the capabilities and requirements of the dynamo-electric system of illumination, and, in my opinion, the unfavourable conditions which I have described would at present exclude its use for underground operations. I may also remark that only movable lights are used for mining purposes, except under very exceptional circumstances, the lamps or candles being carried about and moved from place to place as required, which circumstance greatly increases the difficulty and disadvantage of applying electric lighting in mines. Of course, if fixed lights were employed a greatly increased number would have to be used, as the headings and galleries of the mine are now left in total darkness, except when a collier or hauler happens to pass with his light.

The dynamo-electric light, in its present state, from its intensity and concentration, appears to me to be exceptionally ill adapted for lighting the low and narrow spaces which exist in mines, and I do not think that any arrangements for reflecting the light would overcome the defect. Electric signalling has been used in mines with much success; but the conditions of its application are very different from those of electric lighting.

Pontypool, Jan. 21. GEO. JOHN JER, Mining Engineer, &c.

ELECTRIC LIGHT IN COAL MINES.

SIR,—In reply to Dr. Hawksley's letter advocating the use of the electric light in coal mines permit me, as a practical man employed in coal mines, to make one or two observations on his proposal.

The commonest form of "blower of gas" in fiery mines generally takes place in a holing when the sprags are taken away and the coal comes down. It is impossible to use the electric light in a holing; the incandescence of the voltaic arc in nitrogen, if the glass of the lamp is broken, will fire gas, and an electric lamp will not show the presence of gas, neither will it determine whether it is explosive or not. A safety-lamp is a lamp that is no more dangerous than the electric light if properly handled in fire-damp; provided it be self-extinguishing it can be used as a test lamp, and affords sufficient light for the hewer to work by. If the electric light were projected by a system of mirrors in a 2-ft. heading the hewer would cast a dense shadow on his work, and the tubs would obstruct the light. Again, the motive power must be near the generating machine. This must be given by hot air, gas, or steam; compressed air entails too many pipes. These three agencies cannot be used without interfering with the ventilating current, and any flame is certain death in a fiery pit. Again, some mines have 20 miles of workings. Are all these to be lit electrically? If so, how? If not, lamps must still be used. I do not wish to throw cold water on any scheme which will render coal mining safer; but after every explosion suggestions are made to mining engineers that have received their most careful consideration, as in this case, for some years. I do not think that men employed in fiery mines should wear nails in their boots for fear of sparks, and I think, in common with others, that the lamps are not sufficiently tested before being used. Any suggestion that can be adopted—i.e., that is practical—we are thankful for; but blame is frequently attached to us for not adopting systems which are quite incompatible with the requirements of a coal mine; and having seen and tried every system of electric light (except Edison's) I have failed to see how any one system in its present state can be successfully applied to the lighting of coal mines. ALAN BAGOT, Mining Engineer.

Strand, London, Jan. 18.

NITROGLYCERINE COMPOUNDS.

SIR,—Two important patents have recently been obtained for the Dynamite Manufacturing Company of Hamburg, which, as they are calculated to render the use of nitroglycerine compounds much less objectionable, are worthy the attention of miners. Many attempts have been hitherto made to reduce the sensitiveness or readiness to explode of explosive compounds—that is to say, to reduce their sensitiveness or liability to explode by shock, or the explosion of other substances, and the like. Such attempts have not hitherto been entirely satisfactory, but one of the inventions referred to, which is the result of numerous experiments, relates to an improved manufacture by the use of a substance, the addition of which even in comparatively small quantities to an explosive compound will effect a considerable reduction of the explosive properties. This substance is camphor, either natural or artificial, and either in its raw state or refined, and the invention includes substances and compounds which have an affinity with camphor, such, for instance, as oil of turpentine. This reduction of sensitiveness is especially effected in the case of those matters in which the camphor is soluble, and it has been found that camphor is especially soluble in nitroglycerine, and that its reducing action is especially effectual upon all preparations of nitroglycerine. The quantity of the camphor to be added depends on the degree of reduction desired, and may vary from 1 to 10 per cent., but if an especially high degree of inactivity or inertion is desired the quantity may be from 10 to 30 per cent.

The other invention relates to improvements in the manufacture of pyroxyline and other nitrocellulose. Heretofore the cotton or other cellulose used as raw material for the manufacture of pyroxyline or other nitrocellulose has been employed in an undivided or in an imperfectly divided state produced by rending or lacerating the said cellulose. This undivided or imperfectly divided form of the raw material has the disadvantage that the nitrification is incomplete, so that even the best quality of English pyroxlyline contains some untransformed cellulose. Furthermore, the washing and neutralising are rendered difficult by the coarse form of the raw material; and finally, the product obtained allows but an insufficient compression, and consequently a comparatively low concentration of force.

These disadvantages are avoided by converting the cellulose before the nitrification into a fine and impalpable powder by the following process:—The vegetable fibre is soaked with diluted sulphuric acid of from 40° to 45° Baumé, and allowed to remain in contact therewith for some time, the length of which depends on the nature of the vegetable fibre; the fibre is then washed with pure water, and dried. Or the fibre may be soaked with a weak acid liquid (water containing 5 per cent. of sulphuric acid) heated to 100° centigrade, and kept at such temperature for a time. Or the fibre may be dissolved in a mixture of sulphuric acid and water, then precipitated by mixing with water, and finally dried. The cellulose treated by one of the above-described methods becomes after drying a fine impalpable powder. In lieu of the sulphuric acid a solution of choride of zinc may be used.

The powder obtained by this process or method is converted in the usual well-known manner into pyroxyline or other nitrocellulose. The inventor is aware of its being already known that cellulose treated by the above-described method is converted into powder, but the use of this powder for the manufacture of pyroxyline has not been heretofore known. The use of such powder has the advantage that a more effectual explosive compound is obtained, as the nitrification and compression are more complete, and consequently the concentration of power may be greater than heretofore. That the nitroglycerine compounds surpass all others for strength as blasting agents is well known, and with their improvements they ought to come more generally into use. DYNAMITE.

Frankfort, Jan. 16.

IMPROVEMENTS IN SMELTING.

SIR,—Since it is admitted by all thinking men, regardless of the political party to which they belong, that to abandon the free trade policy deliberately adopted by the country, and endeavour to return to the old system, would be suicidal—and, moreover, would be of no benefit in alleviating the depression of trade which has been so long complained of—I think we may as well cease to think of the absurd suggestion to clamour for reciprocity, and endeavour to find improvements in the processes of manufacture so that we may still be able to compete with the foreigners who are now running us so closely. It is, I believe, admitted that we can still compete with anyone in the manufacture of pig-iron, and if this be so surely we can by inventive energy keep ahead of those who are in a less favourable position for obtaining the raw material. We must have improved puddling processes, and improvements in the processes which follow puddling, and then, as any English workman can do nearly 50 per cent. more work than a foreigner in a given time, I do not see why we should not still keep control of the markets.

For the present I will only refer to two inventions bearing upon the subject, one by an Englishman—or, rather, Scotchman—and the other by a Frenchman, but both, in my opinion, equally worthy the attention of British ironmasters. The invention of Mr. William Ferrie, of the Monkland Iron and Steel Works, in Lanarkshire, undoubtedly promises great results, since the invention really just represents the difference between supplying a steam-boiler with cold and with heated feed water, inasmuch as it relates to improved and simplified arrangements whereby the coal employed in smelting or blast furnaces may be coked so as to utilise the furnace gases, or a portion of them, whilst the coke, and in some cases the ore and limestone, are supplied to the furnace in a heated state, and without involving any difficulties or inconveniences in the construction, or maintenance, or repairs of the furnace.

In carrying out the invention, according to one modification, the top of the smelting or blast furnace is arched over, and formed with lateral openings for the introduction of the ores and fluxing materials, such openings being fitted with doors or valves. Openings fitted with doors or valves are also formed through the arched roof, and supported on iron girders or on arches a little above the roof openings there are set four or other convenient number of vertical retorts of cast-iron or of fire-clay, or built of refractory bricks. These retorts, which are by preference of a vertical cylindrical form, are all encased in a cylindrical or otherwise shaped chamber of brickwork, into which, at one or more lateral points, the combustible gases led by flues from the furnace below are admitted along with the air necessary for their combustion. After acting in the chamber on the retorts, the gases pass off by one or more outlets and chimnies placed at points opposite to the inlets, and the space in the chamber surrounding the retorts has open brickwork arranged in it to distribute the heated gases, and to maintain the temperature as uniformly as possible.

The coal is fed into these retorts at their upper ends, and when coked is transferred from each retort in succession into the furnace below, the bottom of each retort being fitted with a door arranged to be opened simultaneously with the corresponding door in the furnace roof below. The gas evolved in the process of coking the coal may be utilised in the main furnace, or in any other convenient way. A vertical flue may be formed up the central space between the retorts for the passage upwards of a portion of the gases from the main furnace, and these gases may be ignited to assist in the coking operation. According to another modification, the ore or limestone, or both, may be put into the retorts as well as the coal, so as to be heated and prepared by the heat in the chamber surrounding the retorts, and when this is done the ore and limestone are by preference put at the lower part of each retort, with the coal above them.

That this is a substantial improvement in connection with the ordinary smelting furnace I think can scarcely be denied, and the other invention, that of the Baron de Langlade, of Paris—to which I would call attention—is of equal importance in connection with the regenerative furnace. Mr. de Langlade proposes to obviate the disadvantages which have hitherto attended all attempts at puddling in regenerative furnaces by the employment of coal gas, or gases obtained from combustibles of analogous nature—that is to say, which yield a gaseous mixture containing carburet of hydrogen, and it consists in subjecting the gas previously to its introduction into the furnace to a washing or cooling process by the aid of suitable apparatus. The washing apparatus employed may be constructed of various forms and arrangements, the essential feature consisting in the prompt action of the apparatus. It is, therefore, necessary that the gas should be mixed with water in a fine state of division, either in jets, in spray, or in sheets, as near as possible to the generator, and that this mingling should be renewed as often as the locality and supply of water at hand will allow. The water which has been employed for the washing may be conducted into tanks, where the useful products it has carried with it may be collected.

As a convenient mode of carrying out the invention the gas generated in a furnace is conducted up a vertical flue or chimney into a horizontal passage communicating with the upper part of a washing apparatus termed a compressor, and consisting of a vertical cylinder or tube, into which water is introduced through a pipe situate at the upper part, and down which it is caused to fall in a finely divided condition by means of a perforated plate of sheet-iron provided for this purpose immediately above the aperture for the admission of the gas from the furnace. The gas and water pass together to the bottom of the tube or cylinder, which is in communication with a horizontal passage or chamber, in which the water is collected, while the gas passes into a second washing apparatus termed an anti-compressor, similar in construction and action to the one hereinbefore described, excepting that it is somewhat shorter, and that the gas enters at the bottom instead of at the upper part, being thus caused to travel in an opposite direction to the falling water, so as to counteract any excess of pressure which may have been caused by the action of the first washing apparatus, its effect depending upon the quantity of water employed and the height of the fall.

The gas leaves this apparatus by a passage situate at the upper part, and is conducted to a third washing apparatus consisting of a tube or cylinder, the gas being admitted at the upper part, and water being introduced by a pipe near the lower part in the form of a jet, which meets the gas as it enters at the top, and falls back with it to the bottom. The gas is then conducted along a horizontal passage, into which water is introduced in the form of spray or jets through suitable pipes. The water collects in a sheet on the bottoms of the passages, and is drawn off through overflow channels. The draft may be augmented or diminished by increasing or reducing the supply of water to the compressor and anti-compressor, or by modifying the height and sectional area of either of these apparatus. The pressure of the gas may thus be regulated at will, and it will be necessary to adjust it in such a manner as that the gas may always reach the furnace under a slight pressure. Portions of this apparatus may be dispensed with according to circumstances, or equivalent apparatus may be employed capable of producing the same results. The gas on leaving the horizontal passage last hereinbefore described passes into a puddling furnace constructed upon the principle of what is known as the Siemens regenerative furnace, or into a furnace of any similar construction.

Now, in connection with the manufacture of both iron and steel, the smelting furnace and the regenerator furnace must be looked upon as very important pieces of plant of an ironworks, and if we can improve these we shall have done a great deal towards enabling cheap and good metal to be placed in the market; and I believe it to be essential that the quality especially should be attended to, so that English iron and steel may again be known throughout the world as of a quality that can be depended upon, though sold at a price which makes it acceptable to the consumer. H. C. B.

Birmingham, Jan. 18.

WELSH GRANITE QUARRIES.

SIR,—The various articles which have appeared in the Journal recently respecting the increasing demand for the production of the above-named quarries would have been still more interesting to your readers if the following statistics had preceded them. According to returns published by the Roads Department of the Home Office the total sum spent on all roads in the Metropolis was 320,091*l.* in 1861-2, 384,169*l.* in 1862-3, 413,078*l.* in 1863-4, 460,000*l.* in 1864-5, 515,013*l.* in 1865-6, 714,662*l.* in 1866-7, and 781,003*l.* in 1867-8. Should the increase in expenditure have followed the last ten years in a corresponding ratio the amount expended per annum at the present time would be almost incredible.

The following additional statistics will be interesting to many of your subscribers. In 1869 Bond-street is stated to have cost 245*l.* for maintenance, of which 216*l.* were spent for metalling. The macadamised portion of Piccadilly cost 1384*l.*, of which 1359*l.* were spent on metalling; Bridge-street cost 3s. 6½d. per square yard, or a total of more than 341*l.*, of which 305*l.* were spent on the granite alone; Parliament-street, 528*l.*, of which 473*l.* were spent on metalling; Victoria-street, 869*l.*, of which 774*l.* were for broken granite; Kensington-road, 1588*l.*, out of which as much as 1414*l.* were spent on the cost of the granite.

The wear of macadamising material in the Metropolis may be inferred from the fact that, although the most durable granite known would necessarily be used on Westminster Bridge, it requires a coating of no less than 5½ in. annually. The average cost of 5 oz. granite metalling delivered where required in London is set down at 16s. per ton. The Carnarvon Bay District Quarry proprietors have a future before them that should make them regret their age, however young they may be.

Mr. Frederick A. Paget, Civil Engineer, in his report on the "Economy of Road Maintenance," states that there are more than 1100 miles of macadamised roads, exclusive of paved streets, with an estimated total area of nearly 23,000,000 of square yards, within the metropolitan limits. These totals, he says, are really far below rather than over the mark, as they do not include the areas of private roads, of which there exists a great number, especially at the outskirts, such as towards Battersea, Lewisham, Islington, Hackney, and other districts. Besides in the few cases, such as Marylebone and others, in which incomplete returns, lengths, or areas could be obtained, the figures given have been estimated low.

He estimates, also, that there is an additional 30 miles of public and private park roads to be added; he further adds that Mr. Browse, Surveyor of the Metropolis Roads Office, has not less than 70 miles of macadamised turnpike roads beyond the metropolitan area, but still in Middlesex. These 70 miles have an average width of 40 ft., without reckoning the footpaths. Thus, taking the districts of Plumstead and Lewisham, the furthest from the centre of London, as giving a measure in the ratio of the area of their roads to acreage, of the proportion of roads on the outskirts, we should find that within a radius of only 12 miles from Charing Cross there are at least 40,000,000 square yards of macadamised roads.

The total population of 1861 was three times that of 1801, having trebled itself in 60 years. From the figures giving the population of London at the end of every decade since 1801 it can be seen that since the beginning of the present century the metropolitan population has doubled itself in about 40 years.

The Registrar-General estimates that the population, which in 1866 was more than 3,000,000, will at the present rate of increase in 40 years be doubled, or will rise to 6,000,000. Such an increase would embrace the occupation probably of about 60 square miles of additional open country. This would give an area of one-half more than the present for paving and macadamising material; therefore the demand for good granite for paving as well as macadamising must necessarily increase. This increase has already shown itself in the Carnarvon Bay quarry district in a most conspicuous degree during the last few years, more especially in the eyes of those who have known the district for some 10 or 15 years past.

In one of the quarry shipping places on Tuesday last eight sailing and two steam vessels were to be seen, and it was roughly estimated that the tonnage of the vessels thus waiting for cargo could not be less than 1800 tons. The demand for the Carnarvon Bay district

granite is so great that the provincial towns afford a ready and more remunerative market than the Metropolis seems to hold out just now. The Val de Travers Asphalte Paving Company, in 1871, states that from competent sources it is computed that the 5000 miles of London streets consume annually 650,000 tons of granite, and the streets of provincial towns are set down at 20,000 miles. The present consumption of granite in the form of setts, crossings, channelings, kerbings, and macadamising material will probably exceed 1,000,000 tons annually, which, of course, will go on increasing as new streets are opened, and the necessary improvements in the streets and roads proceed.

According to the Mineral Statistics of the United Kingdom for 1858, compiled by Mr. Robert Hunt, F.R.S., the sett quarries at Penmaenmawr turned out during that year—Messrs. Kneeshaw and Co., 38,762 tons; Messrs. Brundrit and Co., 91,318 tons: making a total output from these quarries of no less than 130,080 tons of stone. The famous Welsh Granite Company's quarries in Carnarvon Bay were so little known at that time (20 years ago), although now probably the most extensive and profitable in the kingdom, that no mention is made even of their existence. The present output from the Carnarvon Bay quarries now, I should think, very considerably exceeds that of Penmaenmawr, and the output of the former district is being materially increased, and in a very short time will be very much further augmented by the production of new quarries about to be opened out. The output from the North Wales Granite Quarry alone during the first year of operation is expected to exceed 10,000 tons. The West Nant will yield an equally large quantity, and the production from these quarries and the Aberavon is capable of great augmentations for many years to come.

The Carnarvon Bay district not only possesses great advantages against most all others for commanding the market of the provincial towns, but it is also admirably situated for commanding the Metropolis. There is a splendid opening in this district for the employment of at least 150,000*l.*, with more than a probability if not (looking at the enormous yearly increase in the consumption of this description of granite in various forms) a certainty of realising at the least 50 per cent. per annum interest upon such outlay. I hope some of your numerous enterprising readers will avail themselves at the first opportunity of a visit to the district in question. If this is brought about, Sir, through the medium of your columns they will bestow a great boon on the labouring population of the county, where the present depressed state of trade is fast bringing misery into their homes.—*Bangor, Jan.* 23. EDMUND SPARGO.

CORNISH MINING, AND ITS PROSPECTS.

SIR,—I presume that nobody will attempt to dispute the fact that the mining population of Cornwall is much distressed at this moment; but it unfortunately happens that correspondence like that which has lately appeared in the Daily News and other papers is most mischievous in its effects, and calculated to increase rather than allay the evils referred to. Although the authors may sympathise with the miner and his family in poverty, and desire to alleviate their misery, it is evident that being technically unacquainted with mines and mining their language conveys the impression that Cornwall as a mineral producing county is pretty nigh finished, and the mines generally worked out—an impression of a most erroneous nature. As these papers are circulated in every part of the kingdom, capitalists must infer that it is policy to avoid speculating or investing in metallic mines in that county, and however unwittingly or with whatever purity of intention these sketches of Cornwall may have been made, it naturally tends to increase, or to say the least prolong, the difficulties of the mining population by creating a consternation outside the county which is not warranted, and consequently a disinclination to assist in forwarding such mining enterprises as would relieve the people and ultimately enrich the investors also.

Mining is in a deplorable condition solely through the prevailing low price of metals, and by no means through a decrease in the productiveness of the mines. I need not comment upon the stagnation of trade and commerce generally throughout Europe, that is unfortunately but too well known; but no student of the metal markets, or constant reader of your Journal, can fail to discern signs of early substantial improvement, and it is, therefore, important that the moneyed part of the community should be disabused of the notion that Cornish mines are worked out, or that they are not equally as productive as at any former period of the county's history, and convinced of the reverse—that the deeper they are sunk the richer they become, and that never before did so small a number produce so much tin. The majority of progressive mines have succumbed, consequently the quantity of tin produced in the county is much reduced, which will speedily enhance the price of that metal, and bring Cornwall again to the front, give her miners prosperity, induce explorations in new districts, and the resuscitation of old ones.

The Gwennap district has probably been as productive as any, and from its eastern extremity, where Capt. Pryor contemplates operations at Wheal Clifford, to the western boundary, where the Wheal Comford and the Bell Vean people may confidently expect a rich harvest for their outlay, the ground is undoubtedly still full of mineral treasure, and will, it is hoped, be explored as vigorously as its prospects justify.

Considering that the tin mines now working are in the aggregate about paying cost with that metal at about half its average price, that mine agents are continually lessening this cost by improvements of every possible kind in their mining system, and that according to the best authorities higher prices for metals will shortly be obtainable, in spite of sufferings at present endured, it cannot be maintained that the future prospects of Cornwall and her mining population are so gloomy as those writers have represented, and although large numbers of men may have emigrated to foreign countries Cornwall is not likely to be found deficient of skilful miners whenever they may be required. CORNUBIA.

BELL VEAN MINE, GWENNAP.

SIR,—At Redruth recently a friend put into my hands a circular, or prospectus, regarding this mine, which it is proposed to work effectually by a company, which at present consists of 12 members only, the holders of the 12,000 shares into which the property is divided. These proprietors are desirous of enlarging the capital to 24,000*l.*, and with that object in view they offer a portion of their interest at par—that is, 2*l.* per share. Being well acquainted with this, and every other property in Gwennap, I would remark that the opinions expressed in the reports of Messrs. Josiah H. Hitchins and others are sustained by the existing facts. But there is one fact of importance which is not referred to in the circular—the proximity of the rich copper lode cut a few months ago in Comford Mine, at the eastern side of the sett, and which lode underlies northward into it. At what depth it will come within the boundary line I cannot say.

The position of Bell Vean is unexceptionally good. Comford, a narrow sett, adjoins the far-famed Tresavean Mine, which during the last working yielding 450,000*l.* profit. Further east, in the same easterly direction, is Treviskey Mine, which also yielded very large profits. Westerly from Bell Vean, and contiguous thereto, is the old Penstruthal Mine, which in one year alone gave 60,000*l.* profit. That was in the year 1827, when I lived in Gwennap, and was in the habit of visiting the mine. Penstruthal main lode passes through Bell Vean.

One highly important circumstance in favour of Bell Vean is that Tresavean adit unwaters the mine to the depth of 40 fathoms from surface, so that without the aid of pumping machinery all the six lodes within the sett may be explored without any drainage cost, which makes a saving of about 1200*l.* per annum, besides the purchase and erection of the machinery. The southern lodes can be wrought on still higher backs, because of the rise of the hill in that direction. The produce is both copper and tin. Although the recent operations have been on tin only, copper is expected to be the chief product when the late engine-shaft and adit are cleared. That shaft was filled by debris by the failure of the wooden casings a few years ago. It is now being cleared. There is on the mine a steam stamping-engine nearly in readiness for operation, and a large quantity of tinstone is waiting the reduction process. The manager is Capt. T. Parkyn, of Roche, a man of large experience as a miner, and the resident agent (Capt. Brokenshire) is clever as a miner and geologist. The West Cornwall Railway branch is within the sett, so that transit will be cheap. All the favourable circumstances taken into account, I say that the mine should be worked with vigour. I hope that in a district, now almost deserted, which was formerly the first in the county, the success of this and Comford Mine will lead to the resumption of mines now idle there that employment may be supplied to a population very much in want of it.

Truro, Jan. 22. R. SYMONS.

PARYS MOUNTAIN.

SIR,—A remarkable and highly interesting feature in the history of Parys Mountain Mine is clearly indicated in the report of the *Mining Journal* of last week—the changing of the 90 south passing under the quarry having turned to the colour of the ground found above. Does this mean that the goal of the directors' ambition is at hand? That the shareholders are at the gates of the citadel? In my humble opinion this is certainly very much like it. Great expectations to be arrived at very suddenly, but not unexpectedly either. When we read the manager's reports for the last three months we may at least believe that on cutting suddenly into a mass of ore here it will be of no ordinary sort, but would in every probability be even richer than that found above, and must create a stir and activity in the neighbourhood, sadly needed in these dull mining days. The shareholders deserve every success, and are bound to arrive at it directly. INVESTOR.

PARYS MOUNTAIN, AND MORFA DU.

SIR,—The recent report of Capt. Mitchell on Parys Mountain is very important to those interested in its immediate success. I note a very satisfactory change in the 90 south driving under the quarry—that the ground is becoming changed to the colour of the same above. This means a close proximity to the body of ore discovered a hundred years ago, and which rendered Parys Mountain famous beyond all imagination in wealth, and caused this mine, ere the discovery of ore in Chili and the Ontario districts, &c., to rule the copper markets for so many years. If this unbounded wealth is again struck, to which indications of the strongest kind point, such a rise in shares must immediately follow as will recompense the proprietary in no ordinary degree. It would appear that this matter is very close at hand, and, judging by the great distance driven into the Parys Mountain, is almost imminent. Morfa Du Mine ought to be taken in hand, and the graat white rock penetrated by an adit or the continuation of the same already begun, and no reasonable doubt need be entertained of a great strike of very rich ore, bearing in mind the historical wealth of this wondrous mountain of copper ore.

Chester, Jan. 22. MINING ENGINEER.

RHYD-ALYN,

SIR,—No doubt, as "Captain" said in last week's Journal, the above mine is situate in the heart of the richest lead bearing district in the kingdom. It is now being worked at a good monthly profit by driving adit levels only, which leave high backs to be stoped away at a great advantage and profit. I believe they will be able to keep up their present returns for a long time without sinking below their adit level. The Halkin deep level is now being driven at the rate of about 20 yards a week. Judging from the geological plan, they will reach the coal measures in 200 or 300 yards, then no doubt they will drive on much faster, and will not be long reaching Rhyd-y-Mwyn at this point. The deep adit will be about 100 yards deeper than the Rhyd-Alyn day level; and will, as per geological plan, intersect a large east and west lode which crosses some north and south cross-courses, which communicate with Rhyd-Alyn. This accomplished Rhyd-Alyn will then be dry to a depth of 100 yards below their present day level. Then they can work and stope away on all the rich courses of ore throughout the mine, and make it one of the best dividend paying mines in the kingdom for many years to come. I have good reason to know that the adjoining Llyn-y-Pandy Mine was very rich on the east at 280 yards below the day level, and would have been worked to a greater depth had they the advantage which will soon be offered to the Rhyd-Alyn Mine. ALPHA.

MENDIP MINES, AND MINERS.

SIR,—Perhaps the accompanying copy, taken from an old manuscript, relating to the laws of the Mendip miners may prove interesting to some of your numerous readers:—

"LAWS AND ORDERS OF THE MENDIP MINERS.—Be it known that this is a true Copy of the Enrollment in the King's Exchequer, in the time of King Edward the Fourth, of a dispute that was in the County of Somerset, between the Lord Bonfield and the tenants of Chewton and the prior of Green Oare; the said prior complaining unto the King of great injuries and wrongs that he had upon Mendip, being the King's Forrest. The said King Edward commanded the lord Chock, the lord Chief Justice of England, to go down into the County of Somerset, to Mendip, and sit in concord and Peace in the said County concerning Mendip upon pain of high displeasure, &c. The old Ancient Occupation of Miners upon Mendipp, being the King's Forrest within the County of Somerset, one of the four staples of England, which have been Exercised, used, and continued through the said Forrest of Mendipp from the time whereof no man living hath no memory; as hereafter doth particulary ensue the Order. First.—That if any man whatsoever he be that doeth intend to venture his life to be a Workman in the said Occupation, he must first of all crave licence of the Lords of the Soyle where he doth purpose to work, and in his absence of his said Officers, as the lead-reave or Bailiff, and the lord, neither his Bailiffs can deny him. 2nd item.—That, after the first Licence had, the Workman shall never need to ask leave again, but to be at his free will to pitch within the Forrest, and to break the ground where and in what place it shall please him, to his behalf and profit, using himself justly and truly. 3rd item.—If any doth begin to pitch or groof he shall leave his hacks through two ways after the Rate. (Note, that he that throw the hack must stand to the Girdle or Waste in the same Groof, and then no man shall or may worke within his hack's throwe; provided always, that no man shall or can keep but his wet, and dry Groof, and his Mark.) 4th item.—That when a Workman have landed his Oare, he may carry the same, to what Minery it may please him, for the speedy making out of the same, so that he doth truly pay the lord of the Soyle, where it was landed, his due, which is the Tenth part thereof. 5th item.—That if any Lord or Officer hath once given licence to any Man to build, or set up an hearth, or washing-house, to wash, cleanse, or blow the Oare, He that once hath leave shall keep it for ever, or give it to whom he will, so that he doth justly pay his Lot-lead, which is the Tenth pound which shall be blown at the Hearth or hearths, and also that he doth keep it Tenantable, as the Custom doth require. 6th item.—That, if any of that Occupation doth pick or steal any lead or Oare to the value of thirteen-pence halfpenny the lord or his Officer may Arrest all his Lead-works, house and hearth, with all his Goofs and Works, and keep them as safely for his own Use; and shall take the person that hath so offended, and bring him where his house is, or his work, and all his Tools or Instruments which to the Occupation belongs, as he useth, and put him into the said house, and set Fire on all together about him, and banish him from Occupation before the Miners for ever. 7th item.—That, if ever that person do pick or steal there any more, he shall be tried by the Common Law, for this Custom and Law hath noe more to do with him. 8th item.—That every Lord of Soyle or Soyles ought to keep two Mynedrie Courts by the year, and to swear twelve men or more of the same occupation for the orders of all Misdemeanours and wrongs touching the Mynedries. 9th item.—The Lord, or Lords, may make three manner of Arrests (that is to say), ye first is for strife between man and man, for their workes under the Earth, &c.; the second is for his own d..ty, for Lead or Oare, wheresoever he find it within the said Forrest; the third is upon felons' goods of the same occupation, wheresoever he find it within the same Hill, &c. 10th item.—That if any Man, by means of Misfortune take his Death, as by falling of the Earth upon him, by drawing or Stifling, or otherwise, as in time past many have been, the Workwen of the same Occupation are bound to fetch him out of the Earth, and to bring him to Christian burial, at their own Costs and Charges, although he be Forty Fathoms under the Earth, as heretofore hath been done; and the Coroner, or any Officer at large, shall not have to do with him in any respect," H. C. S.

FOREIGN MINING AND METALLURGY.

In consequence of the greater cheapness with which coal can be extracted in Belgium than in the North of France, Belgian coal-owners are in a relatively better position than their French neighbours. Perhaps, also, Belgian colliery proprietors exhibit a greater flexibility—in other words, a greater readiness to adapt themselves to the necessities of the times. Transport questions continue to attract a large amount of attention among Belgian coalowners. As regards the Belgian iron trade, it cannot be said that the aspect of affairs is improving. Not only have four rolling-mills and two blast-furnaces recently suspended operations in the Charleroi Basin, but strikes have also arisen, as if to increase the general trouble. At the Esperance works the men have refused to accept any reduction in wages. At the forges of the Providence Company a reduction of 18 per cent. in wages was proposed, but the men decline to accept a greater reduction than 5 per cent. At present work has not been interrupted. Contracts for a quantity of iron sleepers are to be let by the administration of the State lines on Feb. 12. These sleepers are intended to utilise 4600 tons of iron and steel rails recently ordered by the Belgian Government from various industrials. The municipality of Brussels will let a contract for a quantity of water-pipes on Jan. 31.

The Northern of France Railway Company has determined on an expenditure of 240,000*l.* for additional rolling stock. In consequence of the opening of various new lines and the acquisition of sundry additional concessions, the company is under the necessity of increasing its stock of locomotives and vehicles of all kinds. It appears from a recent official return that in 1877 there were 308 blast furnaces in the German Empire and the Grand Duchy of Luxembourg, and that of these furnaces 212 were in activity.

There has been comparatively little business passing in iron in the French department of the Haute-Marne. Some small orders have been received for coke-made iron at 6*l.* 8s. per ton. There has been a pretty good demand for plates. In the Nord there has also been only little business doing; proposals have been made to firms, but the latter have imposed conditions which have checked transactions. Contracts for Paris have been discussed at 5*l.* 14s. to 5*l.* 16s. per ton, according to the period of delivery. Similar contracts for the provinces have been discussed at 5*l.* 16s. to 6*l.* per ton. The annual meeting of the French Mineral Industry Society has just been held at Douai. M. Vuillenun, principal engineer of the Aniche Mines, presided, and about 40 members were present. Questions of the Customs' duties and means of transport by canals were discussed in detail. It appears probable that a new tariff for the conveyance of coal and coke will be shortly introduced upon the Northern of France Railway; the new tariff will, it is stated, be favourable to the products of the Pas-de-Calais. The present tariff on imported coal will not be modified. There are complaints of the pressure of foreign competition in the coal trade of the Nord and the Pas-de-Calais. In the basin of the Loire there are fewer complaints than in the coal mining interest of Northern France. The administration of the Upper Italy Railway will shortly invite tenders for the supply of 40,000 tons of coal and 10,000 tons of briquettes.

The stagnation of the iron trade of Charleroi continues to deepen. Hardly any orders, except on State account, are in the market, and these have been taken at very low prices. More workmen have been dismissed from the Liége foundries, where orders also continue to decrease, and prices are extremely depressed.

A letter from Steele to an Essan paper says that the steelworks of the New Scotland Company, which have been silent for three years, are to resume activity this week, and a large number of artisans have been engaged. On the other hand, a report from the Dortmund mining and iron district says that the position of the iron and steel industry there appears to become worse. Complaints are heard from all sides, and the rolling-works especially seem to be short of orders. The machine and boiler-plate works are also in a large number of cases very insufficiently employed, and their productions are sold at ruinous prices. The Bessemer steelworks alone are adequately supplied with commissions. As we lately announced, the *personnel* at Krupp's works, at Essen, has been reduced, and the firm is now reducing the hours of labour of a considerable portion of the staff still employed.

American coals are beginning to be sold in Switzerland. They come by sailing ships from Philadelphia to Marseilles, whence they are brought by rail to Geneva, a distance of 217 miles, and delivered to the consumer at 40s. a ton, a price slightly under that at which French and German coals are retailed in this neighbourhood, and the quality is described as being very much superior.

CHEMICALS, MINERALS, AND METALS.—Messrs. J. Berger Spence and Co. (Jan. 18)—Alum: Loose lump, 6*l.* to 6*l.* 2s. 6d.; ground, 6*l.* 10s.—Arsenic Best white powdered, 9*l.*—Borax: Refined, English, 36*l.*—Copperas: Green, 52s. 6d.; white, 8*l.* 7s. 6d.—Copper: Sulphate, 18*l.* 5s. to 18*l.* 10s.—Nitrate of Lead, 31*l.* 5s.—Saltpetre: Refined English, 25*l.*—Sulphate of Zinc, 12*l.* 12s. 6d.—Sulphur: Roll, 8*l.* 15s.; flowers, 10*l.* 15s.—Tin crystals, 5½d. per lb.—White Lead, 21*l.* to 22*l.*—Barytes: Carbonate, 100s.—Brimstone: Best thirds, 4*l.* 17s. 6d.—China-Clay, 38s.—Oxide of Zinc, 22*l.* 10s.—Talc, 5*l.*—Umber, 70s.—Charcoal: Best stick, 4½d. per bushel; field burnt, 6d.—Globe Steam-Boiler Powder, 16s. per cwt.—Naphtha, 60 per cent., 3s. 6d.

HOLLOWAY'S OINTMENT AND PILLS.—Rheumatism and rheumatic gout are the most dreaded of all diseases, because their victims know that they are safe at no season, and at no age secure. Holloway's ointment, after fomentation of the painful parts, gives greater relief than any other application; but it must be diligently used to obtain this desirable result. It has been highly commended by rheumatic subjects of all ages and of both sexes for rendering their attack less frequent and less vigorous, and for repressing the sour perspirations and soothing the nerves. In many cases Holloway's ointment and pills have proved the greatest blessings in removing rheumatism and rheumatic gout which had assailed persons previously and at the prime of life.

Electric-Bell Signals for Collieries, Factories, Warehouses, &c.,

WITH OR WITHOUT GALVANIC BATTERIES.

NEW SYSTEM—CAN BE RUNG AT ANY PART OF THE ROAD. Cheap, safe, and reliable. Efficiency guaranteed. LINES OF TELEGRAPH erected and maintained. LIGHTNING CONDUCTORS, &c.

For estimates and particulars apply to—

SYDNEY F. WALKER,

LATE G. E. SMITH,

TELEGRAPH ENGINEER,

COMMERCIAL BUILDINGS, LONG ROW NOTTINGHAM

BELTING versus GEARING.

Of late years a great change has been gradually taking place in the Mills and Manufactories of Lancashire and Yorkshire by the substitution, betwixt the Engines and Shafting, of Belting for Gearing, thus doing away with all noise and vibration, as well as wonderfully reducing the cost of repairs; and so manifest are its advantages, that driving by Gearing will soon be the exception.

As a still greater improvement, we beg to submit our Wrought-iron Drums (Rodgers's Patent), of which we are the Sole Makers. Their special merits may be briefly stated as follows:—

1.—These drums absorb less of the power of the engine in friction than any other mode of driving.

2.—Leather belts on these drums will drive considerably more than cast-iron ones, and the belts last much longer.

3.—These drums are not only considerably lighter in the larger sizes, but also infinitely stronger than cast-iron ones.

4.—In case of fire they suffer little damage. We have repaired many hundreds that have been in very serious fires, generally at about 25 per cent. on first cost.

5.—For MAIN DRIVING purposes they are invaluable, especially in case of a new mill, as they do not require such substantial and heavy building construction as is necessary in ordinary cases to withstand the constant vibration of gearing.

6.—The wrought-iron drums and belts are more easily and quickly fixed than gearing.

7.—Greater economy in steam power, as it requires less power to transmit the same effective force with belts than it does with gearing.

8.—Very much greater economy in subsequent repairs, as compared with gearing.

9.—The power is transmitted evenly, faithfully, and noiselessly, and without the vibration arising from defective or worn gearing.

10.—They require no cases for transport or shipment.

In support of the foregoing statements, we may say we have already supplied upwards of 20,000 of these Drums for use in Great Britain and Ireland, and have also exported them largely throughout the Continent of Europe, India, and the British Colonies.

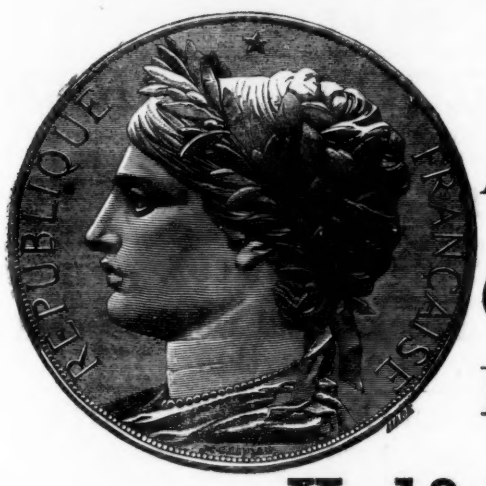
These Drums being made by special machinery, can be made any diameter up to 24 feet, and also any width up to 4 feet, and to fit any size of shaft.

FOR PRICES OF RODGERS' PATENT WROUGHT-IRON DRUMS, APPLY TO

HUDSWELL, CLARKE, AND RODGERS, RAILWAY FOUNDRY, LEEDS, ENGLAND.

Awarded Gold Medal, Paris Exhibition, 1878.

HADFIELD'S STEEL FOUNDRY COMPANY,



FIRST PRIZE MEDALS AT LEEDS, MANCHESTER, AND WREXHAM EXHIBITIONS, 1875 AND 1876.

ATTERCLIFFE, SHEFFIELD,

DEVOTE THEIR EXCLUSIVE ATTENTION TO THE MANUFACTURE OF

CRUCIBLE STEEL CASTINGS,

FOR

Engineering & Mining Purposes,

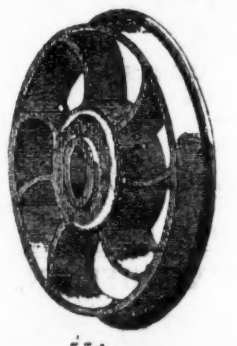
AND ARE THE SOLE MAKERS OF

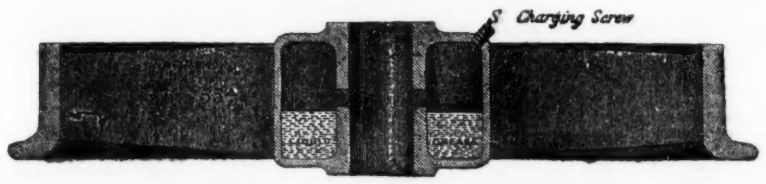
Hadfield's Self-oiling Steel Wheels

(PATENTED).

These possess advantages held by no other wheels, and are specially adapted for Collieries, Ironstone Mines, Slate Quarries, Lead and Copper Mines, &c., &c., where LOOSE Wheels are used (*i. e.*, those revolving upon their own axles). By the old system of lubricating loose wheels, it is well known thisis attended with constant labour and excessive waste; and as so little of the grease or oil applied reaches the wearing surfaces, and as re-greasing can only take place at fixed parts of the workings, the bosses of the wheels and bearings of the axles soon become dry, and cut each other: thus causing enormous wear and tear, and necessitating extra labour, haulage power, and expense. These and numerous other defects are entirely remedied by these wheels, as will be readily seen from the following illustrations and advantages claimed.

N.B.—Price per Set of Wheels and Axles (ready for use) forwarded on receipt of—1. Diameter of Wheel on tread. 2. Width of tread. 3. Diameter and total length of axle, also whether No. 74 or 75. 4. Rail gauge. 5. Rolling load.





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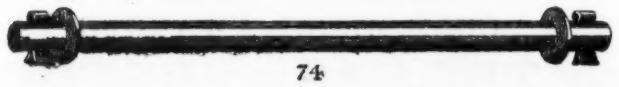
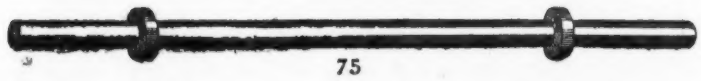




This Advertisement is varied from time to time.

The following are a few of the numerous Advantages claimed by the above Self-oiling Wheels:—

1.—Two-thirds (at least) less grease or oil is required than at present used by any known method of lubricating Mining Wagons, whether by hand, machine, or otherwise.

2.—These wheels effect a very great saving in haulage power; also wear and tear—being so constructed as never to allow the bearings to become dry. The revolving of the wheel leads out the oil as required, and immediately the wagon stops the lubricator ceases its action.

3.—No waste of grease can occur, no matter in what position the wagon may be placed, when discharging its contents (even if up side down); and when the wagons are not in use it is utterly impossible for any grease to escape, as it is all stored below the outlet (as shown above).

4.—When once these wheels have been charged with liquid grease (which can be done by any inexperienced person) they do not require any attention or re-greasing whatever for several weeks or even months afterwards, in proportion to the distance travelled.

5.—These wheels can be readily fixed to any description of either wood or iron corves now in use, whether the wheels are upon the inside or outside of the frame.

6.—They are exceedingly simple in construction, have no detail, and are not liable to get out of order.

7.—They possess great strength, durability, and extreme lightness, being made of CRUCIBLE STEEL.

Where **FAST** Wheels and Axles are adopted instead of Loose ones, *as shown above*, see our Illustrated Sheets of Drawings Nos. 2 and 3 of

Crucible Steel Wheels and Axles, fitted complete by Hadfield's Patent Method, and Hadfield's Self-oiling Pedestals.

At the PARIS EXHIBITION the Jurors have Awarded

THE GOLD MEDAL, THE SILVER MEDAL, AND HONOURABLE MENTION

FOR MY LATEST PATENTED STONE BREAKERS AND ORE CRUSHERS.

Stones broken equal, and Ores better, than by hand, at one-tenth the cost.

H. R. MARSDEN,

ORIGINAL PATENTEE AND SOLE MAKER OF BLAKE'S

Improved Patent Stone Breakers & Ore Crushers.

New Patent Reversible Jaws, in Sections, with Patent Faced Backs.

NEW PATENT ADJUSTABLE TOGGLES.

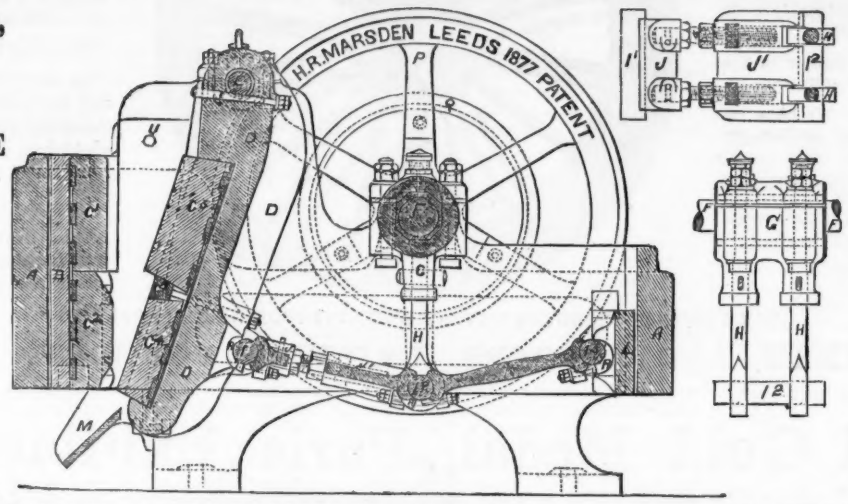
OVER **2500** IN USE.

New Patent Draw-back Motion.

NEW PATENT STEEL TOGGLE BEARINGS.

70

PRIZE MEDALS.



READ THIS—

Wharthole Lime Works, Maryport, Whitehaven, November 7, 1873.

H. R. MARSDEN, Esq., Soho Foundry, Meadow-lane, Leeds.

DEAR SIR,—The machine I have in use is one of the large size, 24 in. by 12 in. The quantity we are breaking daily with this one machine is 250 tons, the jaw being set to break to a size of 2¼ in. We have, however, frequently broken over 300 tons per day of ten hours, and on several occasions over 360 tons during the same period. The stone we break is the blue mountain limestone, and is used as a flux in the various ironworks in this district. We have now had this machine in daily use for over two years without repairs of any kind, and have never had occasion to complain of any inconvenience in using the machine. I hope the one you are now making for me may do its work equally well. The cost—INCLUDING ENGINE-POWER, COALS, ENGINEMAN, FEEDING, and all EXPENSES OF EVERY KIND—is just 3d. per ton. Should any of your friends feel desirous of seeing one of your machines at work, I shall have much pleasure in showing the one alluded to.

I am, dear Sir, yours very truly,
WILLIAM MILLER.

AND THIS—

Wharthole Lime Works, Aspatria, Cumberland, July 11th, 1878.

H. R. MARSDEN, Esq., Soho Foundry, Leeds.

DEAR SIR,—We are in receipt of your letter of 4th inst. I may just state that the stone breaker above named has been under my personal superintendence since its erection, and I have no hesitation in saying that it is as good now as it was five years ago.

I am, dear Sir, yours faithfully,
FRANCIS GOULD.

GREATLY REDUCED PRICES ON APPLICATION.

ALL BEARINGS are renewable, and made of H.R.M.'s Patent Compound ANTIFRICTION METAL.

CATALOGUES, TESTIMONIALS, &c.

H. R. MARSDEN, SOHO FOUNDRY, LEEDS, ENGLAND.

The Barrow Rock Drill

COMPANY

Are NOW PREPARED to SUPPLY their DRILLS, the ONLY ONES that have been SUCCESSFULLY WORKED in the MINES of CORNWALL. At DOLCOATH MINE, in the HARDEST known ROCK, a SINGLE MACHINE has, since its introduction in July, 1876, driven MORE THAN THREE TIMES the SPEED of HAND LABOUR, and at TWENTY PER CENT. LESS COST PER FATHOM.

In ordinary ends two machines may be worked together, and at a proportionately increased speed. They are strong, light, and simple, easily worked, and adapted for ends and stopes, and the sinking of winzes and shafts.

The company are also prepared to SUPPLY COMPRESSORS, and all necessary appliances for working the said Drills.

Apply to—

LOAM AND SON,

LISKEARD, CORNWALL.

BICKFORD'S PATENT SAFETY FUSE

FOR CONVEYING FIRE TO THE CHARGE IN BLASTING ROCKS &c.

Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1851; at the "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the IMPERIAL EXPOSITION," held in Paris, in 1855; at the "INTERNATIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXPOSITION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Altona, in 1869; TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna, in 1873; and at the "EXPOSICION NACIONAL ARGENTINA," Cordova, South America, 1872.

BICKFORD, SMITH AND CO., of TUCKINGMILL, CORNWALL; ADELPHI BANK CHAMBERS, SOUTH JOHN-STREET, LIVERPOOL; and 85, GRACECHURCH-STREET, LONDON, E.C., MANUFACTURERS AND ORIGINAL PATENTEES of SAFETY-FUSE, having been informed that the name of their firm has been attached to fuse not of their manufacture, beg to call the attention of the trade and public to the following announcement:—

EVERY COIL of FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH the COLUMN of GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.

Second Edition. Just published, price 8s. 6d.

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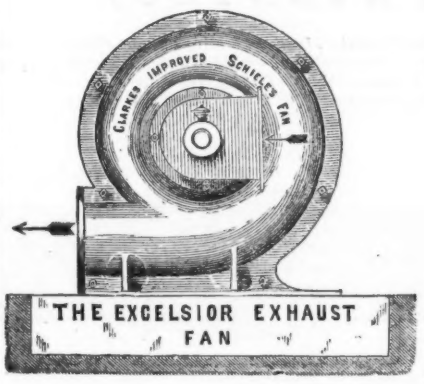

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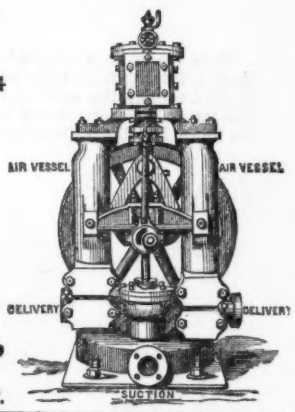

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